

MOTOR AGE

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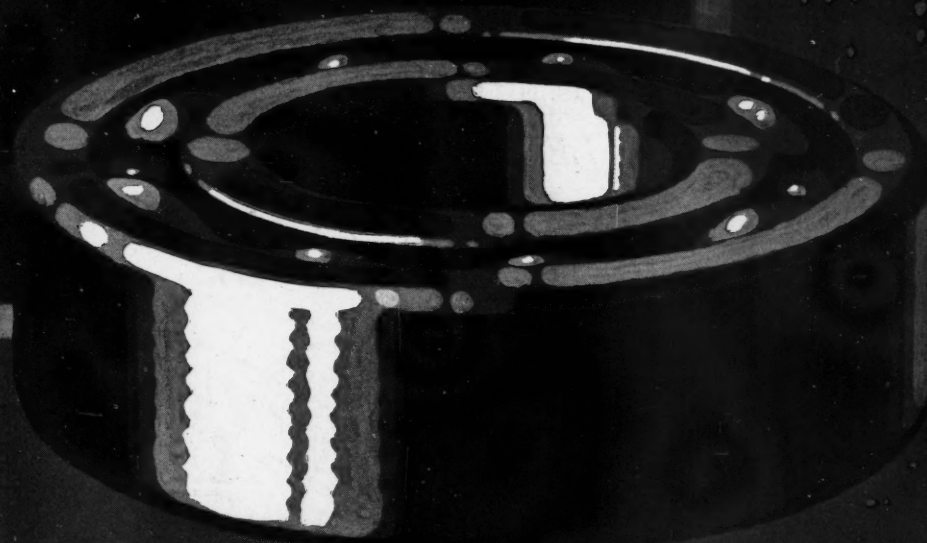
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MANUFACTURING CO.

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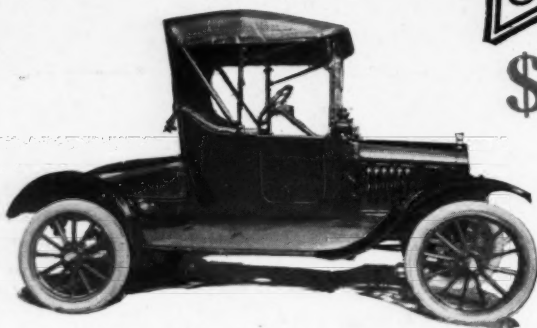
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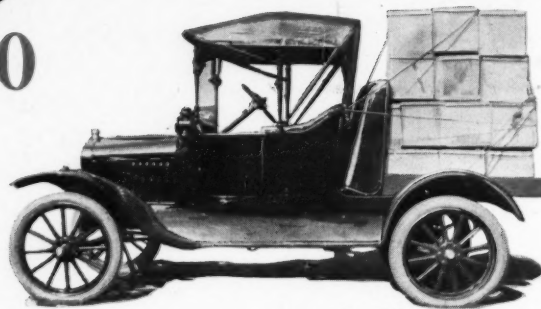
In This Issue—Signs That Signify



\$32.50



2 SECONDS AGO



PATENT PENDING

AND NOW

The NEW UTILITY DISAPPEARING TRUCK Has Proved a Huge Success

As we expected, dealers are quick to see the possibilities in the agency for this proposition. They see that the field is practically unlimited because every person who owns a Ford roadster is a prospect whether he is in business or not. And merchants can be induced to buy a Ford roadster because it will be a half ton truck as well as a passenger car.

In two seconds a Ford roadster is converted into a half ton truck and back again. The truck is completely out of sight under the ORIGINAL turtle back of the Ford. When not in use the **Utility Disappearing Truck** cannot be seen by the most careful examination.

Can be completely installed by **anyone** with a hammer and wrench in **one hour**. Only four bolts used in attaching it. No rattle, no vibration—a firm, secure truck body made of heavy gauge steel.

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No matter what the nature of the load to be carried, if it does not exceed a half ton it can be carried quicker and cheaper with the **UTILITY DISAPPEARING TRUCK**. No extra attachments or parts—just lift the turtle back, slide out the **UTILITY DISAPPEARING TRUCK** and have a half ton truck in 2 SECONDS.

Made of heavy gauge steel, beautifully finished in black baked enamel, and can be pulled out to the desired length. Practically indestructible because no bolts or rivets are used in the acetylene welded body. Strictly highest class construction throughout.

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Order your sample now and write for complete details and the agency for your community.

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San Francisco, 149 New Montgomery Street.

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MOTOR AGE

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"NORMA" PRECISION BALL BEARINGS

(PATENTED)



Day-in-and-day-out dependability never counted for so much—never was worth so much—never was so sought after—as now. To be ready at all times with the full measure of service—to be capable, if need be, of the super-effort that emergency may demand—can any small price-difference be considered for a moment, beside this?

"NORMA" Precision Bearings, in the high-grade ignition apparatus and lighting generators that are rendering maximum service today, are potent factors in the consistent performance which makes these accessories to be preferred where dependability is sought.

Be SURE. See that your Electrical Accessories are "NORMA" equipped.



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Ball, Roller, Thrust and Combination Bearings

When Writing to Advertisers, Please Mention Motor Age

Elcar Four-cylinder Touring
Car and Roadster...\$1095

Elcar Six—Touring Car and
Roadster\$1295



If the Price Were \$500 Dollars More the Elcar Would Be Good Value

THE Elcar is the big outstanding car value of the year. You can pay hundreds of dollars more without getting a bit more in appearance, comfort and performance than the Elcar gives. It is long, graceful and trim in design. The body is finished in the good old durable carriage-maker's way—many processes.



The Elcar is as good as it looks in every way. Motors of famous performance are used. They are powerful, speedy and full of pep. Saving of gas and oil. 18 to 24 miles are averaged to a gallon of gasoline. 1000 miles to the gallon of oil is the rule rather than the exception. Light weight and scientific balance result in long tire mileage.

Every Elcar model allows generous room for its full quota of passengers. It is easy riding under full or partial load.

The Elcar is built to stand up and give years of service. We acquired the habit of building cars good, when making them to sell at \$3,000 and more. Every Elcar part is 150 per cent strong.

Yes, the Elcar is a big buy. If you can get one, you will secure a real bargain. Some dealers have had their year's allotment sold for some time. We suggest you see your dealer without delay.

CATALOG ON REQUEST. Fully illustrates and describes the 1918 models. We gladly mail it to anyone interested. We will also send you name of nearest dealer, if you don't know him.

Brief Mention of Elcar Points and Prices

Four-cylinder models have powerful long stroke Elcar-Lycoming motor, developing $37\frac{1}{2}$ horsepower at 2,100 r.p.m. Six-cylinder models have famous Continental $3\frac{3}{4}$ " x $4\frac{1}{2}$ " engine, developing 40 horsepower at 2,100 r.p.m. Outside of the power plants, the Elcar sixes and fours are practically the same. Two unit electrical system. Long wheel base, 116 inches; road clearance, $10\frac{1}{2}$ inches. Full floating rear axle with spiral bevel driving gears. Timken Roller Bearings front and rear. Double universal drive; tubular propeller shaft. Copper cellular radiators.

A wonderfully easy riding semi-elliptic spring suspension. Roomy and comfortable bodies of beautiful design and durable finish; new "Cathedral Pipe" upholstery. Equipment complete, even to motometer on radiator.

ELKHART CARRIAGE & MOTOR CAR CO.

C-781 Beardsley Ave.
Elkhart, Indiana



When Writing to Advertisers, Please Mention Motor Age

MOTOR AGE

Signs that Signify



How farmers can take advantage of signboard opportunities

THOUGH the great American public by no means can be said to have neglected the manifold opportunities offered by signboards, there are certain phases of these opportunities that are not as universal as they might be with advantage to all concerned. It is just recently that the farmer has been making use of his signboard opportunities. He is apt to make better use of these opportunities during the development of rural express trucking, but it is not necessary that he wait for the establishment of such a service in the community before taking the first step.

Those few who have seized opportunity by the forelock are getting the advantage of doorway marketing of their small prod-

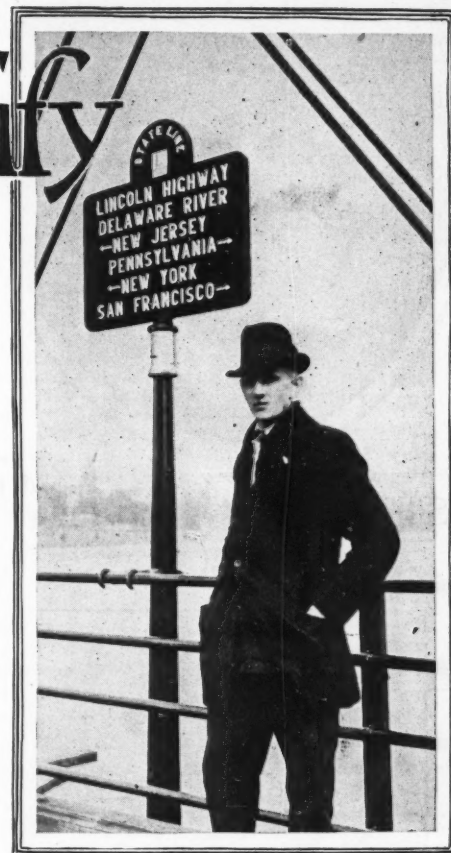
ucts, such as eggs and garden truck. Signs on the roadway in front of the farm announce what the farmer has for immediate sale and what commodities or labor he needs. The women and children often can attend to the calls from passing motorists and dispose of fruits and vegetables, poultry or dairy products at good prices and without the time cost of carrying such a load to town. To allow for timeliness, the blackboard sign is a better idea than a more permanent device. The name of the farmer, the distance to the city and, if there be such, the name of the donor firm usually are painted on the frame of the signboard, leaving the blackboard on which to write the products offered that day. It is not out of reason for merchants and banks to buy these boards for certain farmer customers.

To a motorist away from home the usual advantage that arises from the utilization of signboard opportunities is direction as to where he is and where he is going. Opportunities such as these may be sponsored either by the town or by the local motor club, which usually does sponsor them if it is at all wide-awake.

Not only does the farmer advertise himself and his products through a blackboard set up near his home by the roadside, but the town or club that makes use of such signs as mentioned also advertises itself. Motorists across country, in particular, are interested in the town which gives some information as to its situation on the main highways, health attractions if any, scenic points of interest, etc. If a club in the community is waiting with information that the passing motorists desires, the motorist is indeed anxious to know how to get to that club and something as to what service he will get there.

Information of Detour

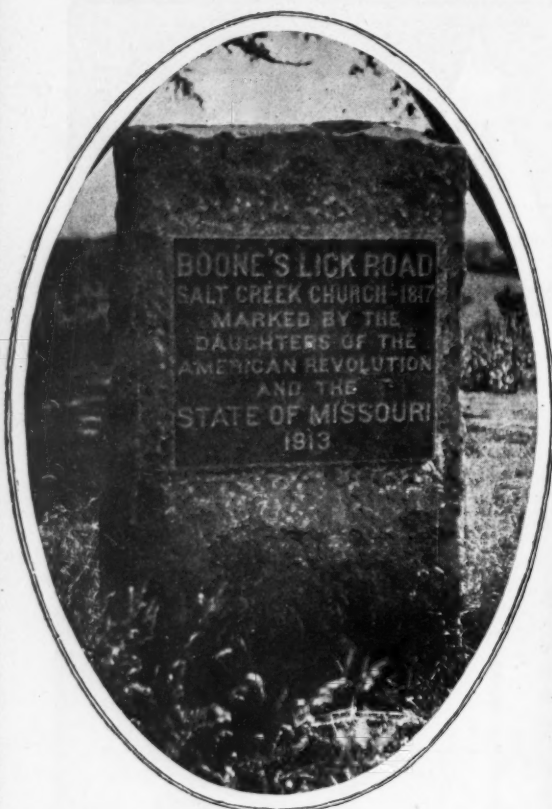
The motorist is eager to recognize and inspect points of historic significance upon a trip. Sometimes a short detour gladly would be made if the spots of scenic charm or the relics of memorable events were known. A motorist wants to know where he is, how far it is to the next town and where gasoline, tire repairs, groceries and hotel are available. A motorist likes to know when a state boundary line is crossed. It is a good idea to have at least the cor-



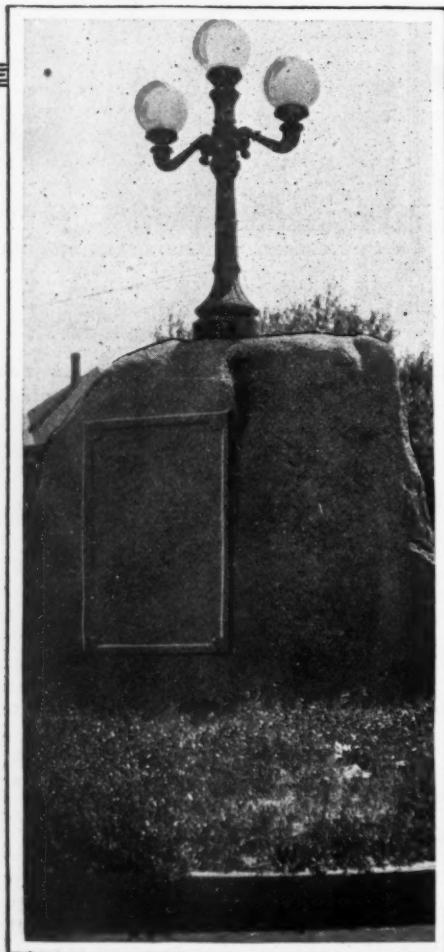
Signboards mark all state lines on Lincoln highway this season

ners labeled to prevent confusion at crossroads. If the town offers the hospitality of free camping sites, they must go unused if motorists are unaware of their comfortable nearness. Dangers ahead can be converted into safety if warning of the danger is given in advance. These dangers sometimes are unapparent to the casual motorist-by. Tall Iowa corn may hide a railroad crossing. A sharp turn in a Colorado canyon course may lead to unexpectedly steep hills or sudden descents.

Naturally the motorist could halt his car and make inquiry, provided he is within inquiring distance of some one or some place. The difficulty with this plan is that in addition to loss of time, the person he directs this question to may not know the answer. Many disappointing replies have been received in answer to questions made by transcontinental or even local motorists. The source of information may be honestly mistaken or he may give data as to a turn at this tall tree and the passing of that school house, another turn at the white



Signboard Opportunities
In Effect Now



Two large and three small signboards in addition to the banding of the telephone pole mark a corner on the National Old Trails as it runs through Missouri, top, while at upper left is a D. A. R. marking

A helpful bulletin board for tourists is located beside the postoffice in the village of Estes Park, Col. On the reverse side of the board appears information about the region

The monument at the left is in the middle of the principal business street of New Franklin, Mo., and commemorates the end of the historic Santa Fe, from which Capt. William Bicknell with four companions led the first organized trade expedition to Santa Fe, Sept. 1, 1821



This is the welcome sign motorists meet on the Lincoln highway when entering Cheyenne, the capital of Wyoming, at the eastern entrance

church, "not the brick church, just beyond, you understand." The one who gives you the information may have ridden over the course hundreds of times and be able to find any landmark designated on a night as dark as the blackest cat, but a signboard would serve better in giving directions that a stranger can follow.

As to directions. Most persons are curiously unobservant of the exact number and direction of the several units of the road or street. The same persons if setting up a signboard to direct motorists would be certain to make sure that such information is correct. Any town which does not post general mileage directions as to the next town, if nothing more, is neglecting its opportunities, and any club in that town which neglects the same opportunities is an accessory to the fact and is not living up to requirements of its organization.

Monument to Pioneers

In this article are contained comments on different signboards, notes made on a tour of two months from Chicago to Colorado and back by a different route. If there is anything in it which helps a merchant, highway organization, motor club or individual make use of the signboard opportunities which exist, it will have attained its object. Otherwise, it can only serve as a series of thank-yous to those who make the path of the motorist smoother.

On the out-bound trip, approaching Lockport, a stone tablet set into a picturesque stone fence in front of a neat farmstead reminds all and sundry of the hastening present generation of the bravery of the pioneers who won this pleasant land through hardships and dangers.

As Ursa the tourist who would camp is saved the embarrassment of an ejection if he reads the sign at the attractive school yard before entering, "Positively no trespassing, camping or herding." Several schoolyards in the Sucker state bore words of similar import, while yet others spoke the same theme by the dumb alphabet of padlocked gates. In this connection it is fair to state that people from Texas reported a silent welcome from the schools of the plains. Houses and shelters enroute to Colorado are in places few and far between, and a few planted trees or the well make the yard of the school a real oasis. The fence would be absent or the gate open and often the building itself unlocked, strangers being tactily put upon their honor to use the comforts wisely.

Nearing Quincy is, or was in the war food-shortage year of 1917, a sign at a field, "Beans planted by William A. Edwards and Quincy Rotary Club." The planting was patriotic, so why hide the light of a good act under a bushel, they must have reasoned.

Distances to Towns

The National Old Trails, of which the Boone's Lick Trail is a part, served for most of the course across Missouri. In most localities it is pre-eminently well marked as to banded telephone poles and metal corner signs mounted usually upon metal posts and indicating the main trail, as distinguished from tributary roads, also giving distances to the nearest small towns and the most important large cities, as Kansas City. Columbia has in the middle

of a business street an excellent sign of this route, mounted upon a pedestal, naming the city itself, with a westward arrow showing the direction and distance of Boonville and Kansas City and an eastward arrow pointing, with the terms in mileage, to Fulton and St. Louis. The pedestal carries flowering plants and bears other words warning of safety and the requirement to drive to the right.

D. A. R. Marker

The state of Missouri has co-operated with the Daughters of the American Revolution to place red granite monuments further marking this trail at scattered intervals. Among the more elaborate of these is one at the Salt Creek Church site. Beside it a high arch, borne by pillars, crosses the road, indicating the cemetery beyond, established in 1817, just a century before these markers were photographed. The site is a "heaven-kissing hill" with an inspiring outlook, an ideal spot for a halt to meditate upon the past of a fair land. The old church is gone, but the mossy, toppling gravestones remain and the grass is kept cut. Most of the burial dates were about 1844.

At New Franklin, not far from the mid-state channel of the chocolate-brown Missouri, this same body of patriotic women has erected an even larger monument to the pioneers who trod this road before us. The inscription is, "Capt. William Bicknell, of Franklin, father of the Santa Fe Trail, with four companions led the first organized trade expedition to Santa Fe, Sept. 1, 1821. . . . This trail, one of the greatest highways of the world, stretched nearly 1000 miles from Franklin, Mo., to Santa Fe, N. Mex. From Civilization to Sundown. Marked by the Daughters of the

Revolution and the State of Missouri, 1909."

A justifiable mention of family pride and a feeling of public spirit seems to have prompted one farmer. Framed by a high background of trees, shrubs and vines a large sign at the fence reads, "Old Homestead Settled by J. F. Rice, 1852. Best Wishes to All. J. D. Rice."

Along the Santa Fe trail occasional stone monuments appeared, as upon the other historic trail to the eastward. At Buckner three of these stones are grouped.

One progressive farmer had painted his silo as a landmark, using three broad bands, the red, white and blue of the National Old Trails group of connecting old roads, now modernized.

Educational Signs

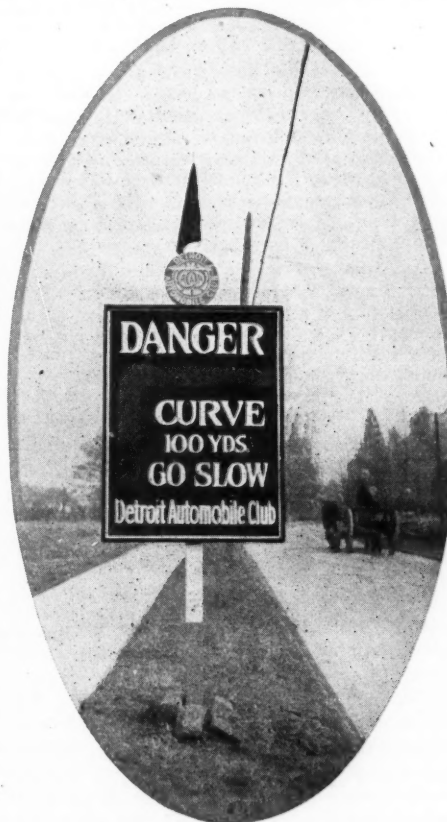
Educative signs picked up in the Sunflower state included those giving the altitudes of cities. Those who have never visited the state before may have a mistaken idea that the high plain begins in Eastern Colorado. Successive city signs teach the error, for the western portion of the state is much higher above sea level than the eastern. Among signs of interest Bonner Springs warns, "Ten dollars' fine for hallooing and disturbing the peace." The Ogden monument marks the geographical center of the United States. At Brookville was the first sign of a free camp ground. Wilson placards, "Tourists welcome. Wilson Club. Telephone Building." Near Ellinwood is a stone Santa Fe marker. Pawnee Rock does a worth-while act in placarding on its main street the existence and direction to Pawnee Rock State park, a few blocks away. Here a monument in a neatly kept square, surmounting a little hill where pioneers, with several famous scouts, held the Indians at bay, is dedicated, "In honor of the brave men and women who, passing over the old Santa Fe Trail, endured the hardships of frontier life and blazed the path of civilization for posterity."

LaJunta offers camps at 25 cents per night per car, fuel and water to boot. Rocky Ford advertises to wayfarers a free camp site at her fairgrounds. Near Colorado Springs the motor club of that city has erected some of the best possible traffic signs. They are not mere danger warnings; they actually specify the character of the forthcoming change in the road. One sign, in three words, signified as many features, "Curve, Hill, Bridge." Symbols even indicated the direction of the turn. On the plains road north of Denver, enroute to Loveland, a large arrow suspended high across the road points to the beautiful university and chautauqua town westward at the base of the mountains, Boulder, stating its distance as 10 miles.

Signs for Safety

The winding course of the road up the 21 miles of the Thompson canon leading westward to the village of Estes Park is made safer by many good signs of the United States forest service, indicating curves beyond which the motorist cannot see and warning him if he has any sense to use it now.

On the Lincoln highway at Cheyenne, Wyo., east of the city, a sign directs strangers to the municipal camp at Lake Mahpahlutah north of town.



One of the signs erected by the Detroit Automobile Club

No Special Curtailment Definite Cut in Car Production Not Asked by War Board

Makers Agree on 100 Percent Priority for Government

WASHINGTON, D. C., May 13—Special telegram—There will be no specified curtailment of the motor car industry. Car manufacturers have agreed with Government officials that war needs demand 100 per cent priority on steel and other materials required for munitions manufacture. The committee, composed of W. C. Durant, General Motors Co.; John Willys, Willys-Overland Co.; John Dodge, Dodge Bros., and Walter Flanders, Maxwell Motor Co., completed negotiations with the War Industries Board with the understanding that the Government will take steel and whatever other materials it needs up to 100 per cent and the motor car manufacturers will arrange their programs accordingly. They will use their proportion of that steel that is left over pro rata with other non-war manufacturers.

Each company has been advised by the committee to consider its production and program problems in view of this arrangement. The committee was informed by the War Industries Board that there had been no official attempt to set the curtailment to 75 per cent, as had been indicated by newspaper dispatches. The committee denied all responsibility for this statement.

Car Makers' Argument

The conference included arguments on the part of the motor car committee to the effect that labor would be thrown out of work, huge organizations disrupted, making them inefficient for war work, and that financial disaster of a \$2,000,000,000 industry would result from a drastic curtailment. When the War Industries Board officials recommended a severe reduction in passenger car manufacture it was pointed out that they had been in error previously, that the shortage situation might clear up in the next 90 days and that the Government did not actually know its own requirements for steel and other materials, and that a severe curtailment might mean the destruction of the huge industry unnecessarily.

When the Government officials persisted the motor car committee stood pat. It stated that it would not set a curtailment figure but would force the responsibility for any such drastic curtailment upon the War Industries Board. In view of its own lack of knowledge of steel and other material requirements, the board hesitated to set a specified drastic curtailment which might be unnecessary and in the near future bring severe criticism upon the War Industries Board, with the result stated above—that there will be no specified curtailment, but instead an arrangement whereby the Government has first and full priority with motor car makers taking what materials are left for use in production of cars.

It was agreed that this plan was by far the best. It prevents all hysteria and panic in the industry and especially among the 37,000 dealers. It gives the Government all of the materials it needs, yet it allows the industry to run up to normal production, as speedily as the shortage situation clears up. According to the agreement made between the industry and the War Industries Board the present 30 per cent curtailment period expires July 31.

The steel situation is the pressing one, and whatever curtailment for next year is decided upon will be dictated very largely by the supply of steel. The Shipping Board, under Edwin N. Hurley, has announced that it is building 4,000,000 tons of shipping, but Chas. M. Schwab, who has assumed charge of ship production, declares that he is going to build 6,000,000 tons of shipping. This will mean a heavy drain on the steel resources of the country. The proposal not to ship steel to any industries for a period of 60 days seems to have been primarily intended to stock up the ship yards with steel so that next winter there will not be any holding back of the ship-building program because of a failure of our transportation system, similar to that of last year. The War Industries Board is determined that those primary war industries, such as ship-building, etc., will be cared for no matter how other industries have to suffer.

The N. A. C. C. has given out the following statement, indicating that it is working in harmony with the War Industries Board on the question of curtailment:

Representatives of the National Automobile Chamber of Commerce, W. C. Durant, John N. Willys, John F. Dodge, Walter E. Flanders, C. C. Hanch and Hugh Chalmers, have just completed a 3-day session reviewing with the War Industries Board, the War Department, the Railroad Administration and other government departments the situation in regard to the supply of raw materials and transportation.

After a thorough investigation the committee was convinced that the government demands were very great and conceding that these demands should be given unquestioned priority, volunteered all possible assistance and pledged the entire resources of the industry to speeding up the war program; keeping in mind at the same time its accomplishment, with as little disturbance to general business as possible.

Until the government needs are more definitely known, the industry, in addition to the manufacture of airplanes, tanks, tractors, shells, mine-anchors, helmets and other munitions will apply itself to helping to solve the great problem of transportation which is directly in its line.

DETROIT ADOPTS WISCONSIN PLAN

Detroit, May 14—Special telegram—To do away with the series of war donations—one coming on top of another—Detroit has combined all its activities into one and will launch a campaign known as Detroit patriot fund May 20, coinciding with national campaign for the American Red Cross. Detroit has pledged to subscribe \$7,000,000. The committee has divided the city into ten sections with district chairman for each. A factory division, under supervision of Witter J. Peabody, will work on the same basis as in loan drive and managements of plants will be asked to underwrite contributions of employees. A definite scale based on income is used.

Small War Trucks Coming Type A and AA Standard Vehicles Probably Not Shelved

Secretary Baker May Take a Hand in the Matter

WASHINGTON, D. C., May 13—Special telegram—Despite the many rumors and predictions that the A and AA standardized war trucks are to be shelved; it now appears likely that they will be a part of the military program as originally planned. It is definitely known that certain officials favoring standardization of trucks have influenced the secretary of war, who is an exponent of standardization, to look into the truck program.

As it has been told in these columns, there has been severe criticism of the standardized truck program and strong opposition on the part of certain manufacturers. The transfer of General Chauncey B. Baker, who originally headed the standardized truck program, and the long delay in placing contracts for the A and AA trucks, samples of which were finished several months ago have created the belief that the standardized program insofar as the smaller trucks were concerned was cancelled.

It is known that Secretary Baker favors the standardized truck program. He displayed his approval at the reception of the B type standardized truck last November. Now that he has been interested in the present controversy it may be assumed that he will throw his influence on the side of standardization.

Type B Situation Unchanged

Washington, May 10—The Class B truck situation remains about the same with Col. C. B. Drake temporarily in charge of the motor division of the Quartermaster Department and Christian Girl, whose resignation has not yet been accepted, still at the head of the Motor Transport Section of the Motors Division, Q. M. C. In all, 1450 Class B trucks have been completed, not including 250 in process of production.

TRUCK PRODUCTION DOUBLED

New York, May 13—During the first 3 months of 1918 the production of motor trucks by members of the N. A. C. C. increased 100 per cent over the production of these companies a year ago. With this gain in production it will not be surprising if the total output of motor trucks represented a higher value for 1918 than the output of passenger cars, which would represent a complete reversal of figures, because heretofore the production of motor cars has been many times greater than that of motor trucks. On a basis of producing 310,000 trucks this year at an average price of \$2,000, with a total production value would be \$640,000,000. There is no figure as to what the output of passenger cars will be, but during the calendar year it will be much less than a year ago. On a basis of 800,000 passenger cars at an aver-

age price of \$700, the total value would be \$560,000,000. More passenger cars than this will be manufactured during this fiscal year.

At the regular meeting of the National Automobile Chamber of Commerce, held last week, three new truck concerns were taken in as members, namely: Sanford Motor Truck Co., Syracuse, N. Y.; United Motors Co., Grand Rapids, Mich.; Ward Motor Vehicle Co., Mt. Vernon, N. Y., and the Standard Motor Truck Co., Detroit, Mich. It is expected that truck membership in the chamber will increase rapidly, now that there are practically two memberships, one for the motor truck makers and the other for motor car makers.

CAR MAKERS APPROVE TIRE SIZES

New York, May 13—Motor car manufacturers, through the National Automobile Chamber of Commerce, have formally approved the schedule of nine standard sizes of pneumatic tires, drawn up by the War Service Committee of the Rubber Industry of the U. S. A. These nine sizes, including 30 by 3½, 31 by 4, 32 by 3½, 33 by 4, 34 by 4½, 35 by 5, 36 by 6, 38 by 7 and 40 by 8, are to be used in equipping all passenger and commercial vehicles up to two-ton capacity. The suggestion that the number of sizes be reduced to these nine standards from more than 200 sizes which now are made, came originally from the Commercial Economy Board of the Council of National Defense.

Car manufacturers have been asked to use only these sizes on cars produced after July 31, 1918. The complete adoption of the schedule eventually will mean a great reduction in the number and size of tires which must be produced by manufacturers and carried in stock by dealers. In addition to eliminating about 190 sizes, the schedule also does away with all styles of bead except clincher, which is used for only the 30 by 3½ and 31 by 4, and straight side, which is used for every other size. Quick detachable and Q.D.-Clincher are eliminated.

TRUCK NAME AGAIN STEGEMAN

Milwaukee, Wis., May 13—The Stegeman Motor Truck Co. has changed the name of its six-cylinder truck from Hercules back to its original cognomen, Stegeman.

PRICE ADVANCES

Detroit, May 10—New prices will be in effect on Dodge Brothers cars after June 1. The price of the touring car will be \$985 instead of \$885, while the sedan will advance \$75, making it \$1,425.

Richmond, Ind., May 11—The price of the Pilot car that formerly was \$1,295 has been changed to \$1,395.

Cleveland, Ohio, May 10—New prices are in effect on the Peerless cars, as follows:

MODEL	NEW PRICE	OLD PRICE
Touring car	\$2,550	\$2,340
Four-passenger roadster ...	2,550	2,340
Coupe	3,050	2,850
Sedan	3,250	2,990

Detroit, May 9—The prices of both the Hupp touring car and roadster are \$1,350 now instead of \$1,250, effective May 1.

Save 10,000 Freight Cars

Driveaways of Past 3 Months
Distributed 38,000
Vehicles

Conservation of R. R. Facilities by Road Travel

NEW YORK, May 13—How the motor car industry is co-operating in conserving transportation is shown by the fact that in the first 3 months of 1918, 38,000 motor cars were driven over the roads to the dealers and distributors by eight of the larger manufacturers. This represented 33 per cent of their production. This number of driveaways relieved the railroads to the extent of 10,000 freight cars.

Reports from different companies show that a large percentage of their cars are being driven away overland within a radius of 500 to 600 miles. During the past 60 days Mitchell Co. has through its dealers driven away 33½ per cent of its production, most of the cars going to Iowa, Missouri, Ohio, Kentucky, Pennsylvania, as well as the nearby states of Illinois, Indiana and Wisconsin.

Studebaker has driveaways to all points in the East, to as far south as the Gulf, and to several points as far west as Nebraska and to Colorado.

Haynes reports that 60 per cent of its output is being delivered by driving overland. One-third of the coal production is being driven away by dealers. Twenty-five per cent of the Anderson output from Rock Hill, S. C., is being driven overland. Dort reports that 20 per cent of its production is being delivered in this way. Crow-Elkhart says that 40 per cent of its distributors, meaning those located in the central states, are driving the cars away.

FIRESTONE RIM COMPANY

Akron, Ohio, May 10—As a matter of operating economy and efficiency, the Firestone Tire & Rubber Co. is separating its rim manufacturing division from the tire and rubber company, so that the rim plant may be entirely in the hands of skilled steel men. The Firestone Steel Products Co. is being formed to take over the rim end of the business. The stock of the new company will all, except directors' qualifying shares, be owned by the Firestone Tire & Rubber Co. J. G. Swayne, present manager of the rim plant, will be vice-president and factory manager of the new company, and the present officers and directors of the rubber company will have leading places in the new concern. It is stated that the plant uses 30,000 tons of steel a month.

C. N. D. LOSES ANOTHER ARM

Washington, May 10—The Commercial Economy Board, A. W. Shaw, chairman, has been transferred from the Council of National Defense to the War Industries Board. It will continue its present work of creating conservation plans for various industries and trades but will henceforth have the name of the Conservation divi-

sion of the War Industries Board. This is one of the last important bodies to leave the Council of National Defense and marks the passing of that organization which it is expected will be completely abolished following the passing of the Overman bill allowing the President the necessary powers.

The new Conservation division plans to create new methods for conserving labor and materials in other trades than the clothing, shoe, paint, agricultural implement and garment industries which it has already aided.

SHIPPING TO SOUTH ON RIVER

Louisville, Ky., May 12—For the first time in the history of local inland waterway transportation, motor cars are being shipped south on barges. One towboat passed down the Ohio river this week with three big barges loaded with 400 new cars bound from Cincinnati to Memphis, Tenn. A large number of the cars were sent from Detroit to Pittsburgh and there loaded on the barges and taken down the river to Cincinnati.

DEALERS SEND MEN TO FIELDS

St. Louis, Mo., May 12—The Clayton Garage Dealers' Association of Clayton, N. M., has sent to N. A. D. A. headquarters a copy of a resolution passed last week which pledges that each member will reduce his force to an absolute minimum during the harvest season in that community that every man possible may be sent to the fields. Only repairs and parts departments will remain open. New business will be ignored.

HARROUN PRODUCTION INCREASES

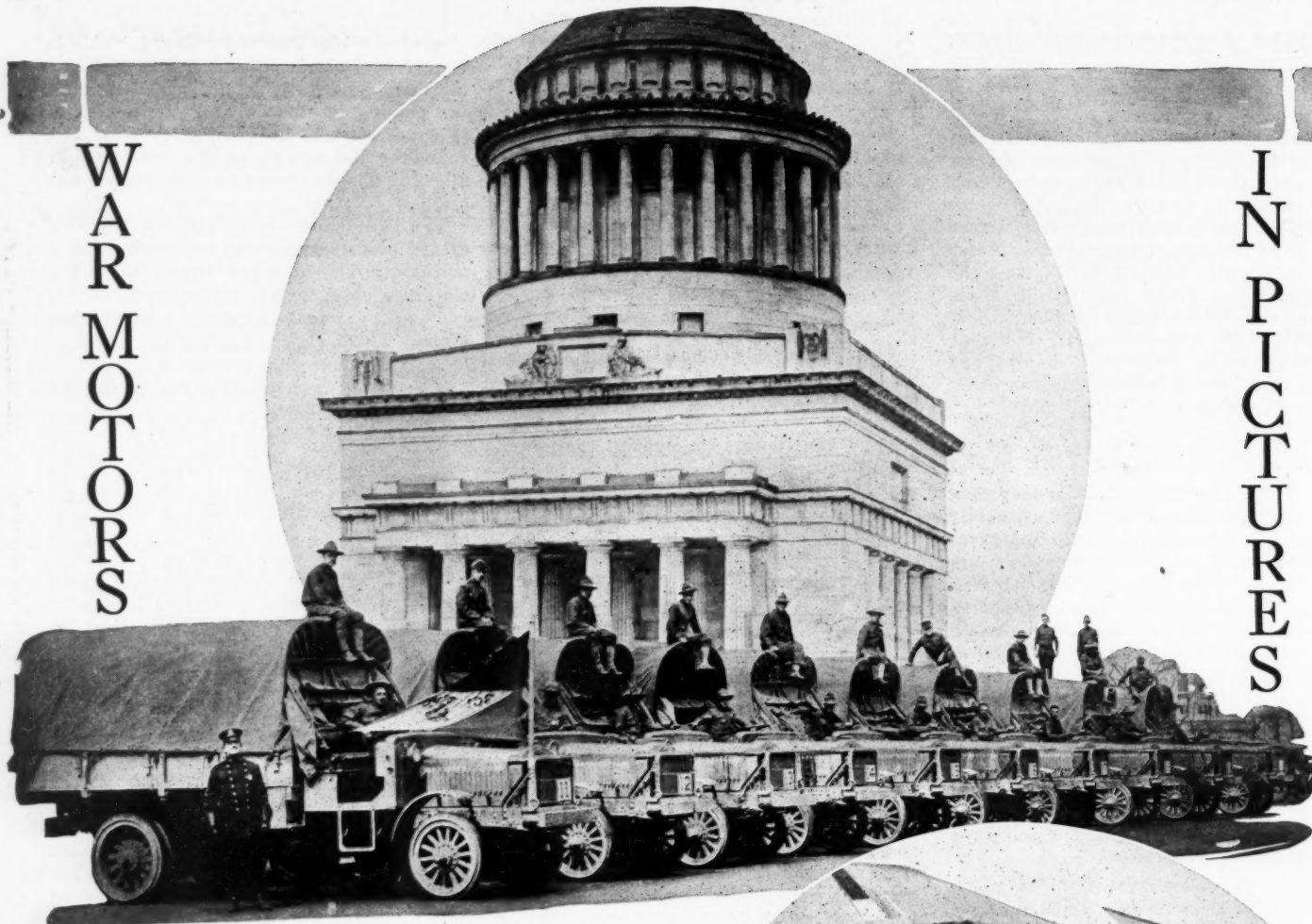
Wayne, Mich., May 10—The business of the Harroun Motors Corp. is steadily increasing and amounts to a production of from twenty to thirty cars daily. The May schedule calls for 500 cars, and indications are that this figure will be exceeded somewhat. The corporation plans to produce 600 cars in June. Approximately 500 men are now employed at the Harroun plants and it is expected that this figure will be doubled within the next thirty days to take care of the 155-mm. shell contract received from the Government.

DIVIDENDS DECLARED

Detroit, May 13—The Continental Motors Corp. has declared a 1½ per cent dividend, payable May 25.

The Maxwell Motor Co., Inc., has declared a 1¼ per cent dividend upon the first preferred stock, payable in First Preferred Dividend Certificates, deliverable July 1 to stockholders of record at the close of business on June 14.

South Bend, Ind., May 13—The directors of the Studebaker corporation have declared the regular dividend of 1¼ per cent on preferred stock, and one per cent of common stock, payable June 1. Colonel George M. Studebaker resigned as a member of the executive and finance committees.

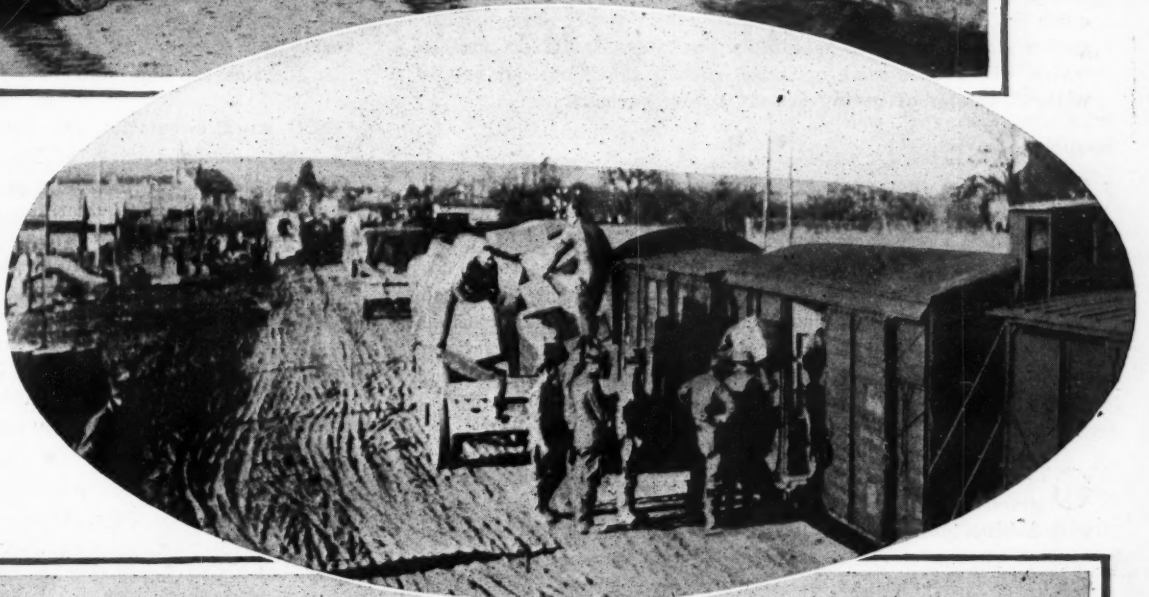
WAR
MOTORSIN
PICTURES

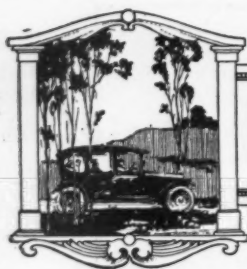
Class B U. S. A. war trucks in front of Grant's Tomb on Riverside drive, New York, top. The trucks are on their way to Camp Devens, Mass. In the circle American and French soldiers are shown in front of the first German plane brought down by United States aviators on the Western front. It is another story to turn to far Bagdad, but here again the versatility of motors is seen—note the cars that reign calm and serene over this railroad smashup in far off Asiatic Turkey



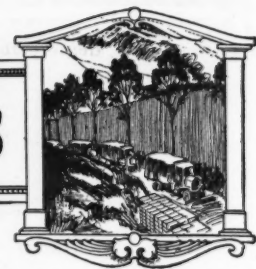


Above American armored cars manned by Belgians are speeding to the firing line, while in the oval, soldiers of the American quartermaster corps are transferring supplies from French freight cars to American trucks that the army may have power. The finely-built British road below runs across what once was a strong German position in France





EDITORIAL PERSPECTIVES



Aircraft Charges and Investigations

WITH the discrediting of the Borglum charges of graft and pro-Germanism in the aircraft program, the thorough investigation as requested by Howard E. Coffin of the activities of the Aircraft Production Board, is one of the sanest suggestions that have come out of Washington recently. Too much secrecy has surrounded the activities of the board, and as a result misleading and baseless rumors naturally have received as much credence as reliable and trustworthy reports. This investigation should result in making public volumes of information which will create some optimism among the American people without danger of giving secrets to our enemies.

THERE are thousands of facts connected with our airplane activities which should have been made public in the last six months. These facts would have had a very desirable effect on the public and would not have given any comfort to the enemy. Senators and congressmen have been misled by alleged official reports and there has been no difficulty of reading these into the Congressional Record, thereby giving them the stamp of approval. Such reports have been taken up by the press and heralded too widely throughout the country.

OTHER misleading reports of a critical nature have been given very general circulation. Recently a hydroairplane with a Liberty engine was flying over an aviation field near the capitol when a single seated French fighting plane drew near and not only flew around the American machine but gave a demonstration of fighting stunts that the fighting plane was never expected to perform. There was only one inference from the report, namely, that our planes were vastly inferior from the to fighting requirements. This story went broadcast. It discounted our own machines. The error lay in the fact that it was utterly ridiculous to compare the two machines. They were intended for entirely different work and each was built for its specific job. The French machine was a stunt battle plane. The American hydroplane was for observation and other purposes. When the pilot of the French machine read the comments in a Washington paper he was thunderstruck at the ignorance of the paper, and amazed to think that such unreasonable and ridiculous comparisons should be imposed on the American public. Such a comparison would never have been thought of in France. The case would suggest a parallel of a fleet motorboat and a sea-going tug in which the motorboat would sail around the tug and perform a dozen other stunts which the tug was never designed to perform.

DISCREDITING of the alleged official report by Gutzon Borglum, the New York sculptor, in official Washington is one clarifying feature of the week. Until the correspondence between President Wilson and Mr. Borglum was made public there was a very general feeling that the president had commissioned Borglum to furnish an official report. Such has been specifically denied. Borglum imposed himself upon the President, and as the President might have done with any other friend, he suggested that they would be glad of any information that would shed light on the highly embroiled aircraft situation.

TOO much circulation has been given to the report of the Aeronautical Society of New York. This report has been peddled around for publicity purposes and can only be construed as a sorehead production. It deals too much in generalities to be of any value. As days pass and the situation clarifies it is constantly more apparent that the Marshall report asked for by the President and properly handed over to the President, as it should be, is a valuable document, and as soon as the Overman Bill authorizes the President to reconstruct the Aircraft Production Board giving the new head, John F. Ryan, authority which he has not to-day, and which Mr. Coffin never had, it is expected that definite progress will be made.

PUBLICITY from the Aircraft Board has been poorly handled since last July. It has been known that there have been divisions of opinion on this. Mr. Coffin has favored publicity, but his advice in this has been over ruled. Unfortunately much publicity that has been given out has not been of the right kind. Facts have been withheld that if made public would have had a wonderful stabilizing influence. There have been flights made with Liberty engines in the past months which should have been carried in every paper in the country. Not a word has been published regarding them, although the enemy has had every opportunity of getting all the information. There have been photographs in connection with these flights that would have set at naught the malicious reports that the engine has not been able at times to get off the ground.

WE should have a corps of ten or more of our greatest engineers continually concentrated on the development of aviation engines to meet the varied necessities of this war. The matter seems so important that practically that many engineers of highest caliber should be in France, handling our work there where they are in constant communication with the front. We should have a great engineering laboratory there.

Tractor Shortage and the Dealer

FROM the dealer point of view, the tractor business so far this year has brought a measure of disappointment. This is occasioned by no lack of demand but is due to a general inability on the part of tractor manufacturers to produce and deliver as many machines as were expected. Perhaps if the demand from the farm were not so universal and insistent this condition would not appear so aggravated.

THE worst feature in the situation is to be found in the effect it likely will have upon many dealers. Basing the conclusion upon opinions expressed by dealers recently it is to be inferred that many of them will feel discouraged and some of them disgusted. In good faith they worked energetically for tractor orders, only to find that after orders had been secured that it would be impossible to make deliveries.

THE disappointment experienced was keener because of loss of dealer prestige than because of loss of anticipated profit. The dealer, in taking orders, in a way pledged his reputation, and a failure on the part of the manufacturer to sustain him imperiled this pledge. However, the dealer should bear in mind that present conditions are abnormal and are not likely to be permanent. The productive capacity of tractor manufacturers constantly is increasing and within a reasonable time it will be sufficient to take care of any demand, no matter how extensive and insistent it may be. This likely will not be this year, but it certainly should come in time. Wide-awake dealers will not become discouraged by present conditions, because they certainly will improve.

UNTIL then, the dealer should lose neither courage nor patience. Nor should he allow his selling efforts to falter. The dealer who at this time perfects his selling organization, tests out his sales methods and keeps up his efforts is the dealer

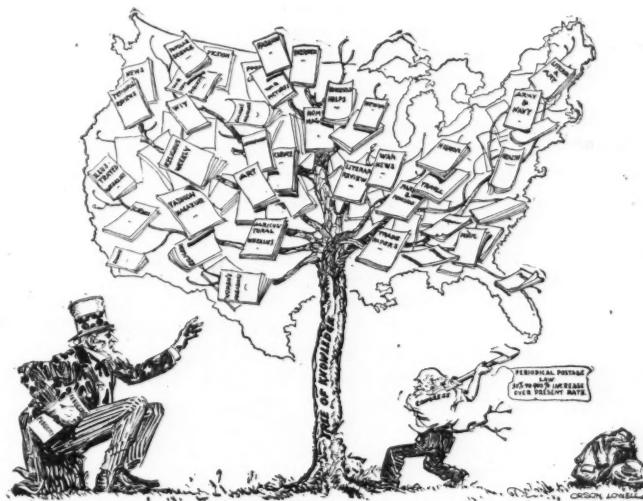
to whom the largest measure of trade reward will come when tractor production finally reaches normal proportions.

ALSO, it must not be forgotten that the ability of tractor makers to deliver machines will be greater for this coming fall trade than it was during the spring season. This does not imply there will be anywhere near an ample supply of tractors, for, upon the contrary, the production, even under more favorable condition from now on, will not be sufficient to meet the demand. This fact emphasizes the necessity for placing orders now for all the tractors the dealer thinks he will possibly need for mid-summer and fall delivery and then be satisfied with such apportionment as the manufacturers are able to give him. In other words, with conditions as they are at present, the whole tractor trade must do the best it can and be satisfied with that. This will be the easier to do because of the assurance that conditions have been improving and will continue to do so.

Will You Sanction This?

When Governor of New Jersey, Woodrow Wilson said:

"It must be that those who are proposing this change of rates (magazine postal rate increase) do not comprehend the effect it would have. A tax upon the business of the more widely circulated magazines and periodicals would be a tax upon their means of living and performing their functions."



When Governor of New Jersey, Woodrow Wilson said:

"This proposed new postal rate would be a direct tax, and a very serious one, upon the formation and expression of opinion—its more deliberate formation and expression just at a time when opinion is concerning itself actively and effectively with the deepest problems of our politics and our social life."

CONGRESS—or a sufficient majority of it—has voted to destroy magazine reading.

It has accomplished this by passing a simple law re-establishing a postal "zone" system for all publications—a zone system and postal principle that was abolished by President Lincoln in 1863, and by establishing through a complicated system postal rates that mean increases of from 50 to 900 per cent postage increases to all periodical readers.

By this "zone" system American readers of periodicals—home, educational, scientific, business, or religious—are to be penalized by enormous postage increases on the weekly or monthly papers they read, and the greater their accidental remoteness from the city of publication the greater is the penalty that is placed upon them.

Magazines have been a slow growth. In the process of their development and evolution it has happened that publishing is chiefly concentrated in the East. This large magazine increase in postage, therefore, discriminates unfairly but with great force against the entire West—beginning even with western New York and Ohio and increasing rapidly until such states as Washington, Oregon, New Mexico and California are to pay nine times the amount of postage formerly paid on the advertis-

ing pages alone of their magazine. What this increase means in cost to readers is incalculable.

It means that hundreds of thousands of readers will be compelled to give up their periodicals owing to the terrific increase in their postage cost.

And the tragedy of this 50 to 900 per cent magazine increase postage law lies in the fact that this loss of readers will come from classes and from sections of our nation where widespread reading should be most encouraged—from people in remote sections where life is a bitter struggle on the margin of subsistence—where the habit of reading is just forming and the little weekly or monthly budget for magazines has but so very recently become recognized as an important item in family life. The terrific magazine postage increase will wipe these out.

This 50 to 900 per cent postage increase on magazines is not a war tax. Publishers were already taxed by excess profits and income taxes. It is not a war tax; Postmaster General Burleson has so stated in his annual report when he declared it is permanent postal legislation—unless repealed through your protests to Congress and Congressmen. Will you write—telegraph—urge the passage of resolutions of protest against this destructive law?

Two Investigations of Aircraft Program Have Been Ordered

By Allen Sinsheimer

Department of Justice and Senate Military Affairs Committee to Look into Air Status

WASHINGTON, May 10—There will be but two investigations of the airplane program for the present, the investigations of the Department of Justice by Assistant Attorney General Frierson, and the investigation by the Senate Military Affairs Committee.

Secretary of War Baker decided against a military court of inquiry stating that it would probably hamper the other investigation. Maj. Gen. George O. Squier, Col. E. A. Deeds and Col. R. L. Montgomery of the Signal Corps yesterday filed requests for the court martial trial.

The attorney general's office states that several days will be devoted to examination of the Borglum and Marshall reports and that following these an investigation will be made extending over several months. Hence it appears that it will be some time before there will be definite results made public regarding the investigation.

Charges of Profiteering

Washington, May 10—New charges of enormous profiteering by airplane makers were made in the Senate yesterday. Senator Thomas of Colorado, a member of the Senate Military Affairs Committee discussed in detail the Aircraft Manufacturers' Assn. This organization, suggested and approved by the National Aeronautic Advisory Committee is a combination of airplane makers created in July, 1917, to allow cross licensing of aircraft patents.

The senator stated that this agreement tends to produce monopoly because it draws all existing patents except improvements on engines and motor power within its membership and secures absolute ownership to the extent that when a subscriber to the association withdraws he cannot take his patents with him. He added that 1100 changes were made in one month by the Curtiss Aeroplane Co. on the Bristol fighting plane and since each change required new plans and specifications, new royalties were paid to the association under one of its by-laws. The association is chiefly composed of the Curtiss and Wright-Martin interests and includes a member of the Advisory Committee in its voting combine.

Early in the airplane program the aircraft board encountered considerable trouble with airplane makers because of patents which were being contested in court and which since each patent holder assessed all of the companies for high royalties, greatly increased the cost of airplanes to the Government. In order to meet this emergency, Congress voted \$1,000,000 which was to be expended in purchasing or condemning the various patents. The National Advisory Committee decided however:

That it was desired to avoid delay and expense.

That it had not the power to determine the value of one patent against another or the validity of any patent.

That it was desirable to reach a fair basis of recognition of the patents that the Wright-Martin and Curtiss claims could be paid to offset each other.

That since the Curtiss patents ran three times as long as the Wright Martin patents, the royalty to Curtiss might be made one-third of the amount per plane to be allowed to Wright-Martin.

That instead of endeavoring to establish a difference between airplane, seaplanes or flying boats, the royalty should be paid uniformly on all three types.

That the royalty should be a flat rate on each plane with or without engine instead of a percentage of cost or selling price.

That royalty should commence on planes manufactured and sold after March 2, 1917, and that those made and sold prior to that date should be exempted from royalty.

Following these decisions, the committee drew up a proposed plan which was submitted to the Secretary of War and interned to T. W. Gregory, attorney general who stated that the association as constituted and cross license agreement are not in controversion of the anti-trust laws of the United States. Senator Thomas claims that this decision was made under the stress of the war emergency.

Aircraft Mfgs. Assn.

The Aircraft Manufacturers' Assn. operates under a plan covering all patents owned by any of its members and is very similar to the cross licensing agreement of the National Automobile Chamber of Commerce. Each member pays into the treasury \$200 for each airplane manufactured and sold with or without the engine. The payments are quarterly and of the \$200, \$135 is paid to the Wright-Martin Aircraft Corp., \$40 to the Curtiss Aeroplane and Motor Corp., and \$25 to the association treasury. Payments to the Wright-Martin company are to end May 22, 1923, and payment to the Curtiss company will end when the total amount paid to them equals the amount paid to the Wright-Martin company, but at any event by October 30, 1933. After May 22, 1923, the amount paid per plane by each maker is to be reduced by the amount of the Wright-Martin royalty and will be \$65 per airplane made and sold during the remaining period that royalties are paid to the Curtiss company.

NAVY AIR WORK EXPANDS

Washington, May 10—Quadrupling of the output of the Navy's big airplane factory at Philadelphia has been ordered by Secretary Daniels. This will be accomplished by making the plant an assembly center for Navy aircraft and by placing contracts for parts of machines with numerous manufacturers.

Figures of production cannot be mentioned, but eight months after its inauguration this factory has achieved the maximum output possible with existing facilities and will change its system of operation to meet the Navy airplane demands. Many of the machines turned out in this plant are equipped with Liberty engines.

Borglum Charges Meet Counter Attack from War Department Profiteering Scouted

WASHINGTON, May 11—The Borglum airplane accusations again occupied the front sector, here, this week. The War Department, using counter-attack methods hurled bombs of evidence against Gutson Borglum, designed to show that he has been guilty of using the President's friendship for the promotion of an airplane company with Borglum's personal influence considered his asset. He is also charged with the statement that he could do anything with President Wilson. Borglum's friends call the charges a smoke-screen thrown out by the men he accused of profiteering in an effort to halt the various investigations.

Those on the inside but without personal interest in the controversy call it "much ado about nothing." They point out that there are delays in production as has been stated by the aircraft officials, but that there have never been specific definite charges of any other wrongs, and they deplore the waste of time, money and effort devoted to the entire matter. They prefer to accept the appointments of John D. Ryan and Gen. Kenly, await the result of the Overman bill on the reorganization, and disregard the vague accusations which have been made against men who have heretofore enjoyed excellent reputations.

The War Department charges were sent to the Senate Military Affairs Committee in the form of letters and documents intended to show that Borglum had attempted to take advantage of letters from President Wilson which he interpreted to grant him official authority as an investigator, by participating in the organization of a new aircraft company. According to the letters Borglum was not to be openly associated with the concern but was to be represented by Benjamin Harris of New York, and was to offer his friendship with President Wilson and his access to airplane plans owned by the Government, as his asset.

AERIAL MAIL THIS WEEK

Washington, May 10—Emergency landing fields for the aerial mail service between Washington and New York will be provided at Baltimore, Havre de Grace, Wilmington and New Brunswick. Three airplanes will be stationed in New York at Belmont Park, six at Busselton, West Philadelphia, and three at Washington. These planes are now assembled at Minneapolis and will fly to their destinations within the next three days.

A special stamp is being designed for all mail to be carried by airplane. The stamp will cost 24 cents which is the rate per ounce for the aerial mail.

Airplane Engine Program Now Ahead of England's

CHICAGO, May 11—The three questions in the popular mind which have been brought uppermost by the charges and counter-charges of delay and graft in the airplane program are: First, is the Liberty engine a success; second, was the delay in our airplane program avoidable, and third, could any other agency than the motor car industry have produced the Liberty engine as well and as quickly as it has been produced?

Pending the report of the present investigation, by the Government, the status of the Liberty engine and the reasons for production of plane engines being behind the production anticipated can be presented at this time.

To whatever extent the airplane production program may be behind expectations, such delay is due to the too optimistic view at the beginning, and to lack of appreciation of the difficulties of the problem rather than to any inefficiency on the part of those who had either the planning or the carrying out of the program in charge and certainly not to any graft. This was the message brought out to the Chicago Association of Commerce to-day in a very illuminating talk by F. E. Moskovics, vice-president of the Nordyke & Marmon Co., one of the builders of the Liberty engine. Mr. Moskovics said in part:

"In considering America's air program, several factors enter which played important roles in the determination of the plans but which are all too easily forgotten now.

Why the Liberty Engine

"Among these the question, 'Why the Liberty Motor?' is foremost. The reasons behind the Liberty motor were primarily the urgent demand for a motor of higher power than any belligerent was then using. Thus there were no fixed foreign types we could copy. And this higher power had to be attained with a less weight per horsepower than ever attained and yet at no sacrifice of strength.

"Secondly—The development of a clean manufacturing type that would lend itself readily to American manufacturing processes and methods—otherwise we could never hope to attain real production."

"Addressing the Society of Automotive Engineers at its annual meeting in January, H. M. Crane, chief engineer Wright-Martin aircraft corporation, summed this up concisely:

It was necessary to build an American engine not because we wanted the eagle to scream, or for patriotic reasons, but for considerations based on practical common sense. If we had imported engines and copied them here, in a year they would have been either American engines or Americanized engines. The only way we could get the industry of the country at work was to use a design that would meet factory ideas in the United States. It is difficult for one engineer to design an engine to be built in another factory in this country, without knowing that factory. It is almost impossible for any foreign engineer to design for an American factory to build a foreign engine, the time for getting it well into production would have been as long as if the engine had been of American design. In addition, the production would never have been half what we can expect for an engine designed in this country, with a

Liberty Motor Maker Shows U. S. in Production Sooner Than Britain Held Possible

knowledge of all American factory practice and personnel back of the design.

"Therefore the Liberty motor had behind it clear, sound reasoning and was not borne of any desire to experiment or to go into new fields merely for the love of adventure—as the amateur critics would have you believe.

"Please bear in mind that there were distinct reasons why our Allies and our own experts determined that more power was needed. These reasons are both military and mechanical, but suffice to say, the demand for more and more power in planes is as loud to-day as it was a year ago—so let us accept this fact as sound.

"Now you have heard that the Liberty motor was not suitable for battle planes—was only good for slow bombing planes. This, of course, is a fallacy due greatly to the fact that there is a grievous misconception as to what is a battle plane—and again to the relation of the motor to plane speed.

"Let me for a moment explain the classifications of planes as used on the fighting fronts. In a general way they can be divided into three broad classifications—machines of combat and pursuit—machines of reconnaissance and observation—and machines of harassment and destruction.

"Now, under machines of combat we have first the little single seated fighter of the Nieuport, or Spau type. These machines have very small wing area, are very light, and have relatively low-powered motors—but attain tremendous speed owing to their small areas and restricted frontal areas. These machines are usually equipped with one synchronized machine gun firing through the propeller. Owing to the necessity of maintaining a nicety of balance, only very light motors can be used in this particular type—and this is a type which by the way is peculiarly French.

U. S. TO BUILD CAPRONI PLANES

Washington, D. C., May 14—Special telegram—Newspaper dispatches that Liberty engine installed in Bristol airplanes at Curtiss plant showed defects are untrue. The trouble is not with engine but with the plane which was not originally intended for Liberty engines and is now undergoing modifications. The Curtiss company originally had Government contracts for 2,000 of these planes which order has been cut down to 800.

The Government has placed contracts for Caproni biplanes and will equip them with Liberty engines for night bombing work. The Caproni will be made in this country. The DeHaviland IV has been chosen for day bombing work. After the Bristol has been modified and found suitable, it will be used for scouting and combat purposes.

"The usual motor equipment of these types is the various rotary motors such as the Clerget-Le Rhone and the 150-hp. Hispano-Suiza—but right here please remember the Germans are using single-seated fighters of the Albatross type with motors weighing more than the Liberty motor and developing considerably less power—so you begin to realize that the motor is not the all-important factor in plane design. There is a balance between the two.

"Also our Italian Allies utilize heavy motors in single-seated machines as illustrated by the Fiat-equipped Pomilio.

"Other combat types, such as the two-seated fighters of various kinds mounting two to four machine guns, all use the Liberty motors; so you see the Liberty motor can be used for battle planes.

"As for the machines of observation and reconnaissance—the use of which aids the army on the ground, take photos and control artillery fire—all can use the Liberty motor.

Suitable for Bombers

"In machines of harassment, such as night and day bombers using one, two or three motors each, every one can use the Liberty motor.

"So you can see the Liberty motor is admirably adapted to nearly all plane types, certainly to a greater degree than any other motor and this was exactly what the designers were aiming at. In dismissing this point, let me say the greatest enemy motor, the Mercedes 260, weighs 940 lb., while the 400 hp. Liberty weighs 812 lb.

"Attacks have been made on the officials for putting so much of the motor building program in the hands of the motor car industry. We were told we should have followed Europe. Who in Heaven's name makes the airplane motors of Europe! Have you ever heard of any German motors except the Mercedes and Benz—both motor car concerns.

"Have you ever heard of any British motors except Rolls-Royce and Sunbeam, both motor car makers. In Italy, Fiat and Issotta-Fraschini. In France, Renault, Hispano-Suiza and Lorraine-Deitrich—all motor car makers. You see it was all right for our Allies and enemies to do this but all wrong for us to do it.

"What other industry had the high technical knowledge and organization and skill to do this job?

"Our amateur critics speak of the horrible delay in getting out these motors. To quote from the *New York Times* of April 23: 'It is not difficult to build planes or create engines, and quantity is but the measure of our almost unlimited and untouched manufacturing facilities. It will be simple.' In answer to our amateur critics on this point. I can only say 'They know not whereof they speak.'

"From the British War Ministry's Report for 1917—very recently published, in the chapter devoted to airplanes the author says, as if in direct answer to our amateur critics:

Experience shows that as a rule from the date of conception and design of an aero-engine to the delivery of the first engine in series by the

manufacturer more than a year elapses. The corresponding period for planes is about one-half as long.

"And this is after our Allies have been at war over 3 years.

"The air program is perhaps not entirely without blame for over-optimism, but if it is to blame it is only for that and it is the very error the critics are now making. Perhaps we overestimated our own abilities, but we aimed high and if we didn't hit the exact target, we at least shot as well as we knew how. In other words, although the schedule was not adhered to, yet all that humanly could have been accomplished, was. In fact, we have lost no real time, measured in terms of possibility of accomplishment.

"The schedule was put high, perhaps higher than it was possible to accomplish, but it was done in a great and patriotic effort to make every one get on his toes—to make each contractor strain to the last notch.

"A word as to the production. For obvious reasons, exact figures of production are a military secret—but I assure you that production is now under way—real production and the figures are advancing weekly. In a really short time from now more Liberty motors will be produced than all motors of a comparable type combined.

"As to the motor itself—I can say it all in a word—it is right—whereas by the very nature of its type it is not revolutionary, yet it is generally conceded by our Allies, all things considered, to be a remarkable motor—and it is desired by all of them to fill out their air program. To-day it stands a substantially finished product and one destined I believe to play a tremendous part in making the world safe for democracy."

SPRUCE PRICES ARE HIGHER

Washington, May 10—Prices of spruce wood to the Government have increased 50 per cent in the last eight months. The demand for millions of feet of spruce for air-planes is the cause. A year ago high-grade spruce sold for \$100 per 1000 ft., but the demand has been great enough, together with an increasing cost of production, to bring the price to \$150 per 1000 ft. Contracts were made in February at \$130 per 1000 ft., but with thousands of men called by the draft these contracts are far from being filled. The Canadian government has made contracts for spruce at \$160 per 1000 ft.

TIRES TO NORWAY

Washington, May 10—A general commercial agreement between the United States and Norway assures Norway of supplies insofar as these can be supplied without detriment to this country, including rubber tires in such quantities as will meet Norwegian needs, 250,000 tons of iron and steel, 7000 tons of copper and 1000 tons of lead.

NEW GERMAN FIGHTING PLANE

New York, May 10—An American airman in France has brought down a new type of airplane known as the Pfalz D 3. This is a single-seater, German chasing machine. It is extremely small, the entire spread

being less than 32.8 ft. It is a good deal like the Albatross but does not seem to have much ascension speed. Another plane of the same type has been brought down by a French aviator.

NOW HOLLEY CARBURETER CO.

Detroit, May 11—The name of the Holley Kerosene Carburetor Co. has been changed to Holley Carbureter Co., which has just been incorporated with a capitalization of from \$100,000 to \$150,000.

Detroit, May 10—The Holley Kerosene Carburetor Co. has received orders for 1000 more Holley kerosene carbureters for England.

102 AVIATION CADETS DIE

Washington, May 10—One hundred and two deaths in flying accidents had occurred at eighteen aviation camps in the United States and at Camp Borden, Canada, where American fliers are training, up to April 24. At this time information is not available from the War Department as to the number of accidents, not fatal, or as to comparisons with the figures showing Canadian flying accidents. It is impossible to make comparisons between the number of accidents as against the miles of flying accomplished, but it can be stated that there are very few mishaps in contrast with the vast number of fliers in training, and there are many less accidents in the American training camps than in the Canadian.

To April 24 there were eighty-six fatalities in the six Texas aviation camps. Fort Worth with three fields and many fliers

Where the Money Goes

WASHINGTON, May 10.—A statement from the Signal Corps was presented today to the Senate showing all aviation expenditures. Total appropriations were \$749,886,000.00 and excess contract authorizations and expenditures amount to \$157,453,000.00. Engines, airplanes, parts, etc., amount to \$229,000,000.00 under the fixed price contract and \$334,000,000.00 under the cost plus plan. Construction work came to \$53,000,000.00 under the fixed contract; balloon division \$16,000,000.00 under fixed contract; schools, experiments, etc., \$850,000.00; pay and expenses \$14,000,000.00 and seacoast and equipment including insular possessions \$40,000,000.00.

The total reported of contracts made was \$556,478,000.00 under the fixed price system and \$350,860,000.00 under the cost-plus-profit plan.

ANOTHER BILLION ASKED

Washington, May 10—An appropriation of \$1,000,000,000 for airplanes has been asked of Congress by the War Department. Other appropriations included in the budget call for \$5,780,335,383 for the Quartermaster Department and \$3,378,302,801 for the Ordnance Department. This demand makes a total of \$2,204,000,000 asked for appropriations for airplanes, of which \$640,000,000 has been granted, while \$400,000,000 asked for recently has not yet been approved.

training under English instructors had forty-nine deaths. Houston was next with sixteen. The rate is low when the number engaged is considered.

INDEPENDENT HARVESTER

Milwaukee, Wis., May 10—Milwaukee capitalists who recently purchased the business of the Independent Harvester Co., Plano, Ill., from the receiver, have organized the Independent Harvester Co., Ltd., with an authorized capital stock of \$3,500,000, in Delaware. The manufacture of farm machinery and implements will be supplemented by the production of tractors. The capital stock of the new company consists of \$1,000,000 preferred and \$2,500,000 common stock. All the assets and approved liabilities of the old concern, are assumed. The Milwaukee men active in the reorganization include Grant Fitch, trustee of the purchasing syndicate, Lawrence Fitch, Francis Bloodgood, Jr., Jackson B. Kemper and Albert J. Earling.

29 M.P.G. ON K.B.C. CARBURETER

Chicago, May 14—From 21.5 miles on a gallon of gasoline to 29.05 on kerosene was the result obtained on a Ford car fitted with a K.B.C. carbureter in a test by the Chicago Automobile Club under sanction of the A.A.A. The car used was regular production, insofar as the gasoline tests were concerned, but used the Hot-Pin manifold in connection with the kerosene carbureter. Two regular Ford cylinder head gaskets and a $\frac{3}{8}$ -in. steel gasket were used under the head when the kerosene tests were made, to lower the compression from 60 to about 53 lb. The run was made over the boulevard system of the city.

In the test for mileage on gasoline one full traffic stop was made; the carbureter bowl finally running dry at 21.5 miles. In tests for acceleration there was a difference of only $\frac{3}{8}$ sec. in favor of gasoline. The trials were made from 5 to 30 m.p.h. In high gear the lowest car speed was about 6 m.p.h., for both gasoline and kerosene. In climbing the north end of Hubbard's hill, the K.B.C. carbureter showed a slight advantage over the stock Ford gasoline equipment, the time for the former being 33 sec. as compared with 34 sec for gasoline. On the south hill a slightly better performance was secured on gasoline, but this was due mainly to ignition trouble which developed while kerosene was tested.

After the kerosene tests the engine head was removed, revealing a practically clean set of pistons, valves and plugs. The latter, especially, were in excellent shape. The kerosene carbureter was a stock model of the K.B.C. Carbureter Co., Detroit.

GOVERNMENT TESTS A NEW FUEL

Washington, May 10—Government tests will be made next week at Pittsburgh of a new substitute for gasoline which the inventor, Dr. Louis Klement, says can be made for 8 cents a gallon. A quantity of the new combustible was prepared at the Department of Interior laboratories here and shipped yesterday to the Government's Pennsylvania experimental station. Government officials here claim the preparation will cost more than gasoline.

Ford Implement Dealers

Specially Designed Machines for Use with Fordson Contemplated

To Be Sold by Agents for the Tractor

COLUMBUS, Ohio, May 13—There has been some speculation as to whether or not Henry Ford & Son, manufacturers of the Fordson tractor, would interest themselves in the sale and distribution of the power farm operative equipment which will be used with the company's tractor.

It now is possible to announce authoritatively that Henry Ford & Son will not directly market any of the equipment. Indirectly, however, the company will dictate absolutely what equipment the distributors of Fordson tractors shall handle.

It is of the utmost consequence to Henry Ford & Son that every tractor put out shall deliver maximum performance, both as respects quantity and quality of work. It is Mr. Ford's conviction that this can be assured only when specially designed machines are used with the Fordson and which shall have been given his personal approval. Every such machine built will be thoroughly tested out and only after it proves to meet every requirement will it receive official approval. Once that is conferred, however, that particular piece of equipment becomes standard Fordson equipment and every dealer who sells the Fordson tractor will sell that and no other.

Special Farm Implements

Mr. Ford long ago requested certain manufacturers of farm operative equipment to design and build implements to be used exclusively with his tractor. Such was the reason behind the development of the No. 7 Oliver engine gang plow, designed and manufactured by the Oliver Chilled Plow Works, South Bend, Ind., and the engine double disk harrow, designed and built by the Roderick Lean Mfg. Co., Mansfield, Ohio. These machines already are being distributed by Fordson agents and other machines are to come. It is the expectation that within a reasonable time there will have been designed and put upon the market a complete assortment of draw-bar and belt-power equipment for the Fordson tractor.

In turn, it is understood that it shall be the policy of the manufacturers of such special equipment that it shall be sold exclusively through the Fordson dealers. This will operate to take the Fordson equipment out of the category of general farm implements and put it into a class by itself. Thus it will be sold as a specialized product and will not affect in any way the traditional policy of implement manufacturers toward their regular sales organization.

Inasmuch as Henry Ford & Son expects to have attained a productive capacity of 50,000 tractors a year by Jan. 1, 1919, and as the company expects to exceed even this production in the future, manufacturers of

farm operative equipment see glittering possibilities ahead of them, provided they can make something which will meet the approval of Mr. Ford. Already evidences of strenuous rivalry in this respect are apparent.

To Distribute Michigan Lot

Detroit, May 11—Completion of the distribution of the Fordson tractors, to make up the 1000 originally apportioned to that state, will be undertaken directly by Henry Ford & Son, Dearborn, Mich., and the medium employed will be the Ford agents in the state. Henry Ford & Son explain that this method has been adopted to the end that the company may become familiar with tractor merchandise.

The price on future deliveries of tractors will be \$800 f. o. b. Dearborn, with the understanding that the Ford agent may add \$15 to this amount to cover freight and service. This price is to persist until the full apportionment of 1000 tractors has been exhausted.

The plow situation in Michigan is in doubt. The Oliver Chilled Plow Works are making a price of \$140, f. o. b. Columbus, to meet the distribution in Ohio and have made a deal with the Bryant Tractor Co., Columbus, Ohio, which definitely takes the plow out of the hands of the implement trade in that state. No such arrangement has as yet been perfected in Michigan, although the Oliver people appear to be disinclined to continue the introductory price of \$125 which was made there originally.

Shipment to England on the English order for Fordson tractors will have been completed within a few days, probably within a week, according to the company. Production at the present time is in the neighborhood of 100 tractors daily, about 70 of which are being shipped into this country. The states which are being favored are Michigan, Ohio, Iowa, Wisconsin, Kentucky, Massachusetts, Tennessee, Virginia, Nebraska and South Dakota. Just as soon as the English order is completed the entire production will be apportioned among these states.

Two hundred tractors a day is the production mark set by Henry Ford & Son after June 1.

1000 FORDSONS FOR HOOSIERS

South Bend, Ind., May 13—Indiana has been allotted 1000 tractors for the 1918 planting season, by the Henry Ford & Son manufacturers of farm tractors. This announcement has been made through the office of Dr. Harry E. Barnard, federal food administrator for Indiana.

WOULD LIMIT IMPLEMENTS

Washington, May 10—The commercial economy board, Council of National Defense, has undertaken a study of farm implements to determine which may be dropped by manufacturers without hampering farm work. Questionnaires have been sent to various associations to learn which implements can be removed to conserve materials, labor, capital and manufacturing facilities for war use.

Japan Government Aids

To Purchase American Cars and Trucks by Subsidy to Buyers

Provides for Maintenance for Five Years

TOKIO, Japan, April 9—The Japanese government has arranged to help in the purchase of American motor cars and trucks by granting purchasers in the empire a subsidy of not more than \$500 and, for five years, an annual maintenance subsidy not to exceed \$150. In return these motor vehicles may be taken by the minister of war for military service when needed. Each car or truck to qualify must have a carrying capacity of at least 1 English ton, or 2240 lb.

The Diet in Tokio passed the military motor car subsidy law recently, and it was promulgated at once by the emperor, the premier and the minister of war. Besides buying imported cars, the law encourages the Japanese to make such cars. A manufacturing subsidy of \$1,000 or less is to be granted on such cars as qualify and which are made by Japanese or by Japanese-owned corporations with factories in the empire.

Three Factories in Nippon

Three concerns in this country now are classed as motor car-manufacturing companies. The furthest advanced is the South Manchuria Railway Co., Darien, which has built a factory and turned out four cars, which are being subjected to experimental tests. The two largest shipbuilding companies in Japan are erecting motor car factories. The Mitsubishi Dock Co., Nagasaki, will construct airplane engines as well as cars, while the Kawasaki Dock Co., Kobe, will build only motor cars. The Japan Car Works, Nagoya, is assembling cars, all the important parts of which are imported from America.

When the cars are in military service their owners will be given a "certain compensatory amount of money" by the minister of war.

Subsidized cars may not be exported or sold or rented to foreigners and may not be given as security.

The war department will make frequent inspection of the cars to detect faults, which will be ordered corrected within a certain period. If the repairs ordered are not made on time, the owners "shall be disqualified and suffer suspension of the right to the subsidy."

The law further says that "A person who possesses foreign-made motor cars which have a capacity equal to that of the motor cars qualified by the law and who uses the cars himself or allows a third person to use them shall be granted a subsidy not to exceed \$50."

Horses are scarce in Japan, and most of the trucking is done by men who pull two-wheeled carts without sideboards. Labor is in strong demand now here, and the use of motor trucks would release thousands for service in factories.

Magneto Ignition for Tractors

Study of Sparks Produced Shows Performance

By J. G. Zimmerman

Service Engineer Sumter Electrical Co.

From a paper presented to Mid-West Section S.A.E.

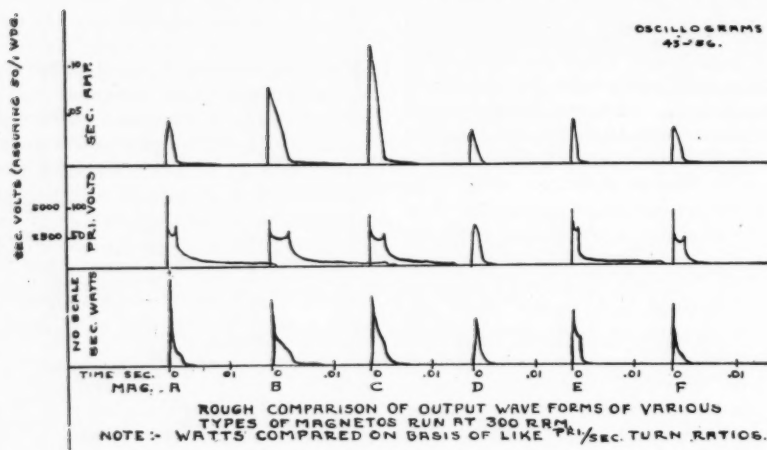


Fig. 1—This chart indicates that magneto types differ according to values of voltage and current

THE tractor engine has to meet different conditions from those of the motor car engine. As a consequence, certain requirements must be more positively met in this application than in the motor car. Of these new requirements, a few are particularly worthy of attention.

In the tractor engine we have what is known as constant-duty work. The engine works hard and at high load factor most of the time; consequently, all appliances and accessories are subjected to harder service than in the motor car. This means then that such accessories must be mechanically well constructed and, as well, made so that proper attention may be given them to keep them in order. It means also that the locations of the appliances must be convenient and well protected. Not long ago I called on a tractor manufacturer who pointed out with extreme pride how he had succeeded in making a fully inclosed engine and gearbox. But as I was a magneto man, I noticed, of course, with particular interest that the only part of his equipment which was not protected was the magneto. It was placed where a single accidental blow readily could put the entire outfit out of commission. It also was placed where dust and dirt could collect in quantity. I am pleased, however, to say that the particular tractor now is provided with better protection for this magneto, in accordance with suggestions made at the time.

Magneto in a Corner

While calling on a truck company, the engineer was anxious to know if our magneto would stand up on his engine. Upon examining the installation, I found the magneto chucked into a corner under the wash with the breaker end toward the rear. It was, because of the particular installation, almost impossible to get one's hand through the available space to get at the breaker box but absolutely impossible

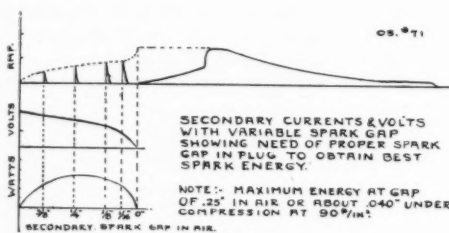


Fig. 2—The records here are those of a magneto at constant speed

to adjust anything without first completely removing the magneto itself. Such an installation leads to poor service.

Another case in hand was a tractor which has the magneto placed where it would defy anyone but a roughneck to attempt to get at it if the engine were hot and things went wrong. One would have to put his arm through a loop in the exhaust pipe to touch the magneto, which also was located where it would become very hot.

Still another case in hand was a matter of wiring. The spark plugs on this tractor are placed where one prefers to wait till the engine is cold before touching anything. One of these four-cylinder tractors was in use at a tractor school and was running on three cylinders. The students and instructors preferred to let it go on three rather than fix the plug fault. As there were ten or more makes of tractors in use, the showing made for this particular make was poor.

One more instance worthy of attention here was one in which the high-tension wire used by the manufacturer was sent out made up in harness, or of proper lengths to suit the installation, by the magneto manufacturer. The party who applied the same used the shortest cable for the longest reach and the longest for the shortest, with the result that the short cables

rested tightly on one cylinder head, while the rest fell loosely all over the engine. There were two instances of this particular wiring and of the same make tractor at a show.

These illustrations are to show that either the engineers putting out the equipments do not realize the importance of proper installation, or they are negligent. At any rate, the need of calling attention to the faults and their remedies is timely.

Much has been said but relatively little done to prove up facts so far as to the finding out of just what constitutes good ignition. I cannot conceive of a charge of gasoline and air at a given temperature and pressure requiring more heat or a higher voltage or any different spark for a small engine than a large engine. It appears to me that, the gas charges being identical, except as to volume, the same spark will ignite either charge with equal facility. In other words, the spark for a given charge must be sufficient and with a good factor of safety. By sufficient is meant of proper voltage and of proper heat value. By proper heat value is meant a sufficiently high rate of heat generation at the igniter device to inflame the charge so it will give the best power stroke.

The timing of the spark is another factor which determines the best power stroke. A very small variation of time when an engine is running at good speed has an effect on the power developed.

The timing of an ignition system is a matter of small fraction of a second. Thus a 1200-r.p.m. engine taking 0.050 sec. per revolution will lose about 7 deg. if the ignition is 0.001 sec. late. The modern magneto furnishes a spark of great accuracy. All magnetos are tested at the factory for accuracy, and it is interesting to note that one seldom sees a variation of 1/2 deg. Battery systems with small timer cams often will vary very materially and, therefore, show less accuracy than magnetos.

Wiring Affects Performance

The wiring of any ignition system has a great deal to do with its performance. Poor wiring can put the best source of ignition out of count with the engine. A case in hand was found at a marine motor company's plant. Here the magneto was O. K. but part of the wiring was run through a metal tube for 4 ft. or more, while the rest was not run through tubing. The tube being grounded and the wire being located inside of it caused a loss of energy, sufficient to make the sparks fail and also to be late when they did spark across the gaps. The loss of energy may be demonstrated readily by running a wire through a tube held in one's hand. By bringing the knuckle of the other hand near the engine, a spark will leap to ground through the body due to static induction alone whenever the magneto furnishes a spark.

To understand the loss of energy just

referred to, it is well to explain how it occurs. The conditions present when two conductors are parallel or near to each other separated by air, or some dielectric material like glass, form what is called a condenser. The larger the surface, the nearer they are brought together without touching, the greater the size or capacity of the condenser. If we supply a charged wire to one of the conductors, the other becomes charged to the opposite polarity. Thus the high-tension wire is charged with + or - electricity from the magneto and the grounded tube becomes oppositely charged. The larger the condenser, the larger the charge it can take on at the same voltage, and also the longer it takes to charge it when supplied from a constant potential. If very large in capacity and the charging current limited as is the case in the magneto, the voltage will not rise to the maximum or high enough to break down the spark gap. It will cause missing.

The energy of the spark is lost in another manner. This is by dynamic induction. Whenever we alter the strength of magnetism within a conductor circuit, a current of electricity is generated therein. Thus the high-tension current when it jumps the gap of the plug passes through the iron tube which surrounds the wire cable and which is a closed conductor around the wire. The change of current in the high-tension wire causes a change of magnetic flux about and in the tube, causing a generation of current and therefore, a loss of energy. The static loss occurs before the spark and the dynamic during the sparking. Both of these factors reduce the available spark energy, and the static losses cause a late spark because it takes more time to raise the voltage at the plug than if there were no loss.

Metal Tubes for Wires

The remedy is obvious. Do not use metal tubes to carry the high-tension wires. Long wires take more time to charge than short wires, consequently, the ideal wiring consists of the shortest possible wires of equal length from the ignition device to plugs. A wire placed too near the engine increases its capacity to take a charge. Hence all wires should be kept at least 1 in. away from grounded parts or other metallic parts. Likewise all wires should be kept at least $\frac{1}{2}$ in. apart and not all run in the same tube, even though it be non-metallic.

The loss of energy is not very great, but nevertheless it must not be considered unimportant. The idea that a magneto develops a much larger energy on the average than is required to ignite the charge means only a total energy. The energy or heat of the spark that does the igniting should follow closely on the heels of the break-down voltage. It is important, then, that no static loss occur to reduce the kick voltage and the consequent energetic follow-up current directly following.

Inasmuch as it is evident that the period of inflammation of a gas charge is very short indeed—at 1200 r.p.m. ignition 30 deg. early, exhaust 40 deg. before i.d.c., it is 0.0236 in.—the moment of ignition is important. This means it must be definite and not subject to variation. The spark, therefore, must occur exactly when wanted, and ignition should occur at a definite time relative thereto. That is, the inflammation should start at exactly some positive period

after the spark starts. Hence, all ignition systems must be so designed that this will be effected. If we will examine the figures it will be evident that this is the case. In Fig. 1 we have a set of spark characteristics taken from several different makes of magnetos for rough comparison. Owing to the difficulty of measuring the spark voltage of high-tension sparks, we have taken advantage of the relation of primary to secondary currents of transformers. Then if we measure the primary voltage and secondary current, we can by ratio of turns approximate the secondary circuit characteristics. Note that I say approximate, as one has no justification for drawing definite conclusions about anything unless positive proof is at hand. We hope, however, sooner or later to be able to obtain the true secondary voltage characteristics as we are working along this line and have some prospects of success.

Referring then, to the Fig. 1 we see that all types of magnetos act about the same save for values of voltage and current. Notice must be taken that the watts calculated from the other data is not in relative terms and that though one magneto apparently out-classes another, it may not in actual performance, since no definite data is at hand as to winding ratios.

Fig. 2 is a set of oscillograph records taken with a Dixie magneto to illustrate a very important fact in efficient magneto ignition. The records are those of a magneto running at constant speed and having the secondary spark gap of needle points in air varied from short-circuit to a gap too large for the voltage to jump. Note that the secondary currents gradually increase as the gap is reduced from open circuit until short-circuit, where the current is changed from a jump spark to a dynamically generated current as the rotors change the flux through the coil.

At open circuit, the current being zero, no energy is available at the gap and likewise at short-circuit none is available at the gap. Hence, somewhere between the two extremes is a gap where a maximum energy will be developed.

In this particular case the maximum is near to $\frac{1}{4}$ in. gap. As this is in open air and at one atmosphere and as the voltage required to jump any given gap increases as the absolute pressure is raised the gap corresponding to this $\frac{1}{4}$ in. between needle points in air will be, at about six atmospheres, $\frac{1}{8}$ that of 0.25 in. or 0.04 in. Since the voltage required to jump a given distance in air increases when the spark gap terminals are charged from sharp points or edges to rounded surfaces the 0.04 in. further is reduced, say, to 0.03 in.

This accounts for the use of a gap approximating this striking distance. This is why the manufacturers of magnetos recommend a gap of from 0.02 to 0.03 in. for their magnetos, as the combination works best under these conditions. All magnetos are designed to generate approximately the same voltage under like conditions, although not always made to that standard.

Primary and Secondary Kick

Take particular notice of the first voltage kick of the primary, which corresponds well to that of the secondary. This is true since the voltage developed by coils of wire over the same core of necessity must develop the same voltage per turn. It is this initial kick that starts the spark going. Anything which chokes or holds back this kick lowers the efficiency of the spark. The voltage kick is almost instantaneous. This means that the charging of the high-tension cable circuit is decidedly preferably instantaneous. Long cables, metal tubes for guiding same, cables near ground or each other and bad insulation all are undesirable.

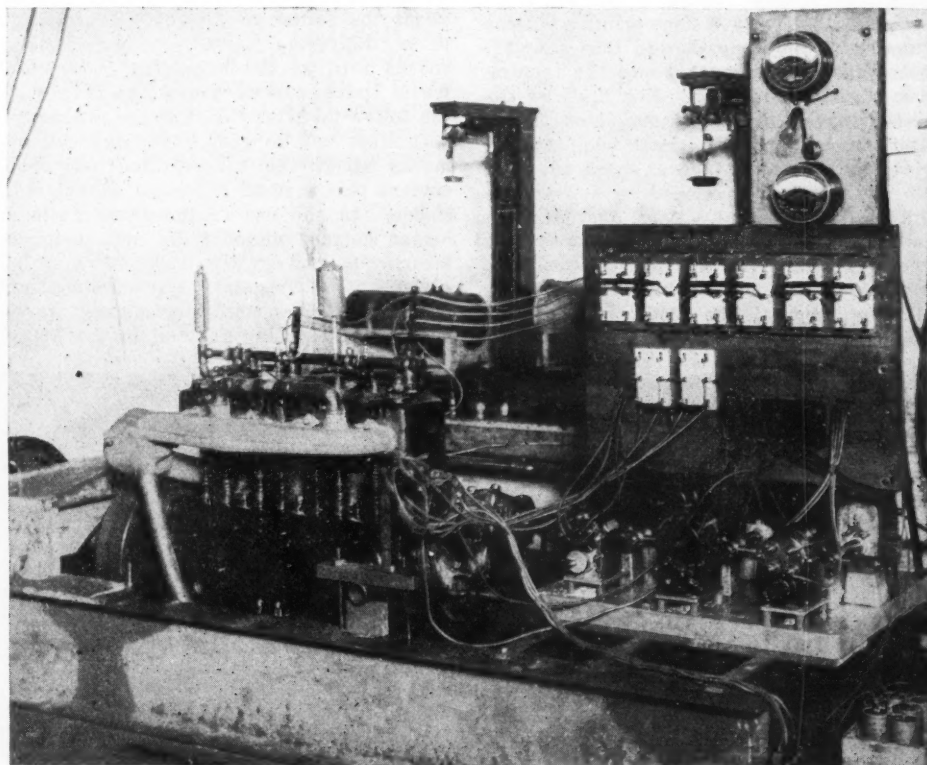


Fig. 3—Tests of six makes of magnetos driven by same camshaft

The initial kick voltage is not the whole spark or the only factor controlling ignition. We must remember that the ignition is effected by the heat of the spark, at least by comparison with other methods of ignition. Consequently, the immediate follow-up current of the spark does the heating or inflaming, and the spark must have a good kick and a proper follow-up current. By immediate is meant the heavy discharge of current developed when a high voltage is on the load, the higher the voltage the greater the current density.

Considering again the time period for igniting the charge, this current must follow closely the breakdown voltage, or kick voltage. If the spark has a certain total heat value or current-times time value, it may or may not properly ignite the charge of gas. It depends upon the rate at which this energy is dissipated. If protracted over a long period, the rate is low; if over a short period, the rate is high. If the rate is high and the energy dissipated sufficiently to heat the surrounding gas to an igniting temperature, the ignition approaches an instantaneous character. The essentials of a good spark are first, a good kick voltage high enough to break down the spark gap and a rapid follow-up current of sufficient heat value to ignite the charge right on the heels of the breakdown across the gap.

Kick Voltage

Some magnetos have a lower kick voltage than others and a heavy, long protracted follow-up current. Such magnetos suffice for low compressions and low-grade fuels but are poor starters at low speeds.

The apparently wonderful fat spark of these magnetos is misleading to the eye. For example, some magnetos drag out the current for 30 deg. or more after the spark voltage breaks down the gap. This is too long, and the heat preferably would be concentrated over a much shorter period at a higher rate.

Tests made with a four-cylinder engine running on kerosene showed that all magnetos now on the market met the requirements of good ignition. Fig. 3 shows the test using six makes of magnetos driven by the same camshaft. Each magneto was given its own advantageous spark advance. No one magneto developed an appreciable difference in output. Any one magneto could be thrown on at any moment so that during the test the fuel, carbureter, load, spark plugs, cables and water temperature all were identical. It must be remembered that carbureter and compression conditions

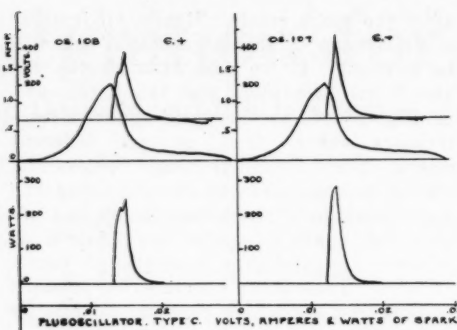


Fig. 4—Spark energy of small oscillator of the plug oscillator type

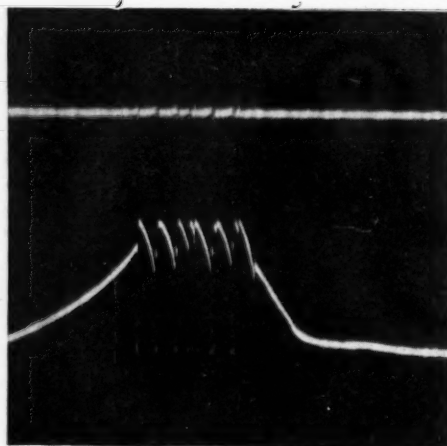


Fig. 5—Master vibrator using magneto coil applied to a magneto

were ideal in these tests and that under other conditions of poor mixture adjustment or spark timing one magneto may show marked advantages over another.

It was particularly noted on examining the timing that all systems were found in almost exactly the same advance. In other words, the first part of the spark did the work, which checks the foregoing remarks about the follow-up current. Those magnetos delivering large or long lasting sparks fired at the beginning before the whole spark was developed, proving that the follow-up after that was not necessary.

It must not be construed from the remarks about the concentrated follow-up current that a small follow-up always will suffice. In the use of low-grade fuels a longer current undoubtedly will help in insuring a good ignition though it may be perhaps a bit irregular. But sure ignition is better than missed explosions. Slow-speed engines using fuel oil or low-grade

kerosene preferably are ignited by a fatter spark. The make-and-break ignition system is preferable for several reasons. The energy of the spark is greater than in high-tension systems and the fouling of a plug or igniter is less apt to occur in low-tension ignition. In the high-tension systems the voltage over the insulation is from 2500 to 4000 volts or more, depending on the compression, temperature and spark gap, while in make-and-break oscillator systems, it seldom exceeds 250 volts.

Reference to Fig. 4 shows the spark energy of a small oscillator of the plugoscillator type, which is a combination of a magneto and make-and-break mechanism into one unit and suited for use on single-cylinder engines only. The spark output is much greater in this little magneto than in the largest standard high-tension magneto in extensive use to-day. There is no reason why on slow-speed tractor engines the make-and-break system should not prove as satisfactory, or more so, than it does with high-tension ignition, now that we are forced to use low-grade fuels. Those small plugoscillators are proving a wonderful advance over the older battery systems in the case of small farm engines.

One reason lies in excellent design for efficiency and mechanical durability. Another is the fact that with such a device the spark may be tested at any time to prove its condition and thus allow the engine user to find trouble if it be elsewhere. It also can be cleaned very readily. It is quite possible, therefore, that low-tension ignition may gain in use on tractors when low-speed single-cylinder engines furnish the power. We have run these plugoscillators successfully at 1200 r.p.m., which is two to three times the normal practice and not feasible for regular use.

Reducing Speeds

The magneto develops a weaker spark with reducing speed and at very low speeds, below 50 r.p.m., it is very difficult to start an engine on the magneto. As tractor engines are usually heavy and hard to crank, starting is very difficult without some means to help give a satisfactory starting spark. A battery and coil system requires a separate battery and coil in the form of a high-tension vibrator coil or a master vibrator using the magneto coil. Reference to Fig. 5 shows the latter system applied to a magneto. The sparks are satisfactory. The user has one thing to keep in mind, and, that is, of course, to turn the switch over to straight magneto on getting the engine up to speed. Unless some extra

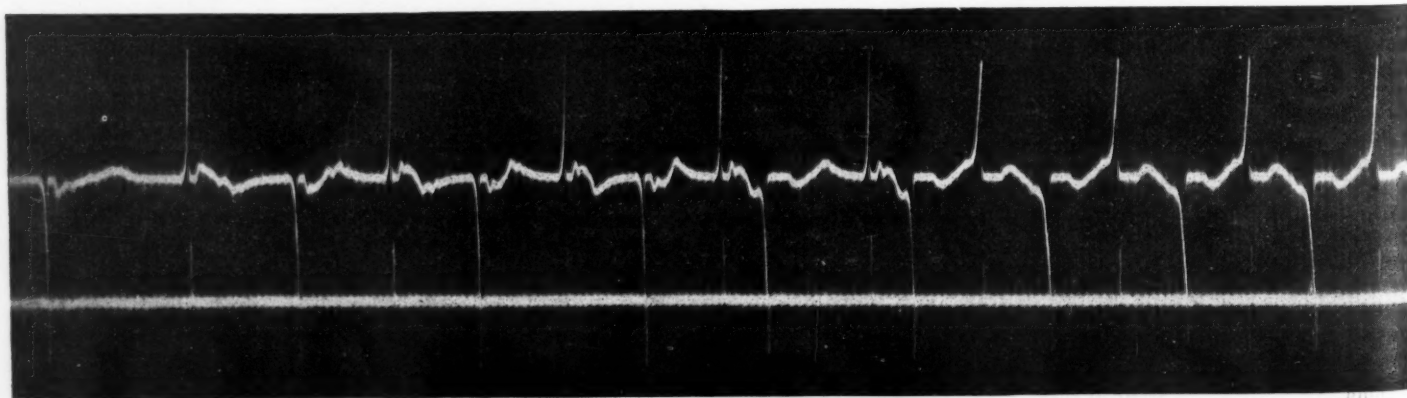


Fig. 6—Action of starter coupling operating from start to throw-out, up to which engine speed increases

automatic device is used with it, he sometimes forgets to do this and finds that when he wants to start up the next time, the battery is dead.

The most satisfactory device now in practical use is the starter coupling. It is a simple mechanical self-contained automatic or semi-automatic attachment to a magneto by which the operator may crank his engine at any speed he desires after priming, and it automatically will deliver a fine spark. After the engine is under way, the device automatically cuts out and leaves the engine running on the magneto alone. The semi-automatic outfit is preferable for good reasons. It is seldom necessary to run a tractor engine below 100 r.p.m., and for mechanical reasons the device is not suitable for continuous service, its object being to start the engine. The wear is less than half that of the automatic types.

To show the advantage of the starter coupling over straight rotary action Fig. 6 is given. Here with the magneto operated at 120 r.p.m., the spark energy is less than half that when the coupling operates. An interesting feature of any properly designed starter coupling is to retard the spark no matter where the advance lever is located. Hence, the starter coupling insures greater safety to operator if used. Fig. 6 shows the action of a starter coupling operating from start to throw-out. Note the increasing speed of engine up to that at which throw-out occurs. Note also the secondary spark values.

N. A. C. C. URGES ROAD PROGRAM

New York City, May 13—The N. A. C. C. at its board of directors meeting last week adopted a resolution urging the Federal government to adopt a highway program which will admit of the highways carrying their proper share of the transportation burden of today. A report from the roads committee of the Chamber showed that 400,000 motor trucks are now in service, and that the first indication of the part the motor truck is going to play is the assurance that short-line railroads are going out of existence and that no more of such will be built.

Cry for Central Road Authority Grows

Highway Organizations Urgent in Demand for Federal Department

WASHINGTON, May 10—Appeals are being made to Congress and the President to create a centralized highway department which would formulate a definite and permanent highway policy and have authority to direct the administration of that policy.

Resolutions of the same tenor as those passed by the Chamber of Commerce of the United States at its annual convention in Chicago were adopted by the United States Good Roads Association at its sixth annual convention and by the Highway Traffic Association of New York. The resolutions also have been endorsed by the American Association of State Highway Officials.

Need for the co-ordination of highway requirements and the adoption of a National policy becomes apparent when it is known that nine different Federal departments and commissions have a direct interest in highway transportation. These departments are those of War, Commerce, Agriculture, Postoffice, Labor and Treasury, the Director of Railroads and the Fuel and Food Administrations.

State control results in lack of attention to the main inter-state highways, which are so essential to the movement of army trucks; to operation of inter-city motor express and freight lines, which help to relieve railroad freight congestion; and to postoffice and private rural parcel post and express service, which are becoming such important factors in helping to solve the food situation.

The belief that it is necessary for the Government to settle on a policy of immediate improvement of the roads that best will serve the needs of the War Department and commerce is growing. This is necessary also to render each community more nearly self-sustaining in food supplies, reduce rail shipments and stimulate increased production.

IMA, Ohio, May 10—That every man between the ages of sixteen and sixty should be required to do a minimum amount of work so that an adequate supply of labor will be formed for the carrying out of necessary public improvement, such as the building of roads, was approved in a resolution adopted at the convention of the Ohio State Automobile Association here May 3.

The resolution reads as follows:

Whereas, man power will win the war;

Whereas, the man power of America must be exerted to the utmost, not only on the battlefields of Europe, but in our supporting the boys at the front;

Whereas, this support is liable to be retarded by lack of man power for the building of necessary military highways and similar public improvements, for the operation of various important methods of transportation and communication and for the carrying on of essential industries, therefore, be it

Resolved, that this association go on record as favoring measures which will enlist the man power of Ohio to the greatest possible degree; that measures be adopted similar to those in other states, requiring not only that every able-bodied man between the ages of sixteen and sixty be self-supporting and engaged in useful employment, but that a minimum of such effort and employment be required of every such able-bodied man; that measures be adopted making possible the assignment to essential work of such vagrants, loafers, or any others who may not be expending the minimum or necessary amount of effort to carry on the nation's work; and, be it further

Resolved, that a copy of this resolution be forwarded to his excellency, Gov. James M. Cox, with a request that he take such action as may be within his powers to this end, and, that the same be brought to the attention of the next regular or special session of the state assembly.

Resolution Unanimously Adopted by the Meeting of Highway Transportation of the Chamber of Commerce of the United States in Session at Chicago

April 11, 1918

WHEREAS, the Chamber of Commerce of the United States, assembled in its War Convention in Atlantic City last September, urged as a war measure the prompt improvement of public highways; and

WHEREAS, the transportation requirements of the country, due to the war, can be only met by complete co-ordination of the carrying capacities of railroads, highways and waterways; and

WHEREAS, there has developed in our country a tremendous increase in highway transportation for the haulage of munitions, foodstuffs and essential supplies; and

WHEREAS, we recognize the necessity of a Federal wartime

policy in respect to highway improvement, permitting the various states to immediately formulate a definite highway program; therefore be it

RESOLVED, that we urge upon the Federal Government and the several states the importance of adopting a program that will insure adequate highway construction and maintenance; so that our highways may properly carry their share of the burdens of transportation; and be it further

RESOLVED, that we urge upon the President and the members of Congress the creation of a centralized Federal authority to determine the highway policy of our Government, with power to direct the administration of that policy.



Loss of weight in stock is negligible when carried by the rural express

Rural Express Aids Farm Man Power

Trucks Replace Labor in Maryland Agricultural Districts

WASHINGTON, May 10—Farmers can make motor trucks pay them good dividends by rural express service to haul farm products from the farms of their neighbors as well as from their own to nearby cities. It has been demonstrated that the farmers who have established such lines not only have increased their own profits but are rendering an inestimable service to the Nation. The establishment of such routes in a territory will enable the farmer to stay on the farm, where he is needed, instead of spending a portion of his time on the road. Such saving will help to offset the reduction of available labor caused by the entrance of farm hands into the Army. In addition, the establishment of such routes will reduce the amount of short-haul freight, which is one of the chief factors in railroad freight congestion.

The really important feature is that by means of the motor truck rural express farmers can produce the same or greater amount of food as before with a smaller number of men, because he can have these products delivered at the city markets in much less time than if he employed his own horses and wagons for the purpose and at the same time he can stay on the farm for the entire day. While these considerations are not yet understood as being of vital importance, they will become so, as the increased food production required and the depletion of labor on the farm becomes greater as the war continues.

What It Means to Farmer

Just what a rural express line means to the farmer who operates it and to the farmer in his territory was brought out most forcibly at the meeting of the Highways Transport Committee with the motor publications last week. The meeting had the opportunity of listening to J. S. Barnesly of Montgomery county, Maryland, who operates a fleet of four trucks to haul produce and milk from Olney, Md., into Washington, 21 miles away. He is a farmer and

By Darwin S. Hatch

Editor, Motor Age

dairyman and put his first motor truck into service four years ago, for his own use, but now is operating all four trucks continuously, carrying not only his own products to Washington, but carrying those of his neighbors and also hauling goods from Washington to the farmers in his territory on the return.

He says that the farmer must have a truck, that in his one county of Montgomery 500 young farmers have gone to war and that motor haulage is helping very materially to make up for the lack of farm labor. For instance, one man hauled 600 bu. of wheat in a truck in the same time

that two men with a four-horse team hauled 100 bu.

The use of the truck also has released farm land for marketable crops which before had to be devoted to upkeep of horses. Before getting the trucks, he used to maintain eight horses on the 116-acre farm; now he has three horses and is farming 39 acres of the 116 that he could not farm before.

He makes daily trips to Washington, hauling the milk from his own dairy, as well as from those of his neighbors, and during four years' operation, has never missed a trip, and has never lost but one can of milk. That this service is valuable is evidenced by the fact that railroad conditions make it necessary for Washington to depend very largely on other than railroad haulage for its perishable supplies and now the city is short 4000 gal. of milk a day.

In the particular community in which this farmer lives, which is 21 miles from Washington and 9 miles from a railroad station, but with good roads connecting it with the market, the farmers have been able to increase the productivity of their land through the use of motor truck haulage, because the latter furnishes them with a good market for dairy products and thus permits them to keep a dairy herd, the fertilizer from which has resulted in a much better crop production per acre.

The Load Returning

The goods taken back to the rural sections by the trucks consist of general merchandise, farm implements, meats, canned goods, seeds, etc. Barnesly charges 30 cents a 100 lb., delivered at the door of the farmer. The railroad charges 14½ cents, delivered at the railroad station, which, in this instance, is 9 miles away. The farmers figure that the labor saved in direct delivery is more than worth the difference, as it eliminates 18 miles of driving and time taken from the farm work.

Barnesly's trucks include a Studebaker, a Jeffries, an I. H. C. and a Nash, at least

MUD PUNCH TO GOOD ROADS

Monmouth, Ill., May 9—Mud had its inning in the good roads gathering here today. Most of the seventy delegations organized in fifteen counties to launch the campaign for the \$60,000,000-bond issue for good roads started for here in motor cars—but it rained. Fifty machines from Peoria, including the city fire department, were turned back a few miles out of town by impassable mud. Between 5000 and 10,000 cars from other communities had the same mishaps, and the motor car parade which was to have been held here dwindled rapidly.

The bond issue was indorsed by the delegations who did arrive. A parade 1½ miles long was held, and one of the most enthusiastic good roads rallies ever held in Illinois followed. Though it has been the policy of the state throughout to postpone the actual building of the 4800 miles of paved state highways until after the war, the example of Canada in advocating immediate road work as a prime wartime necessity was mentioned.

one running every day of the year between Washington and his farm, including Sundays and holidays. He has kept accurate figures on the cost of maintenance.

Purchases of new trucks and maintenance of those in service are paid for out of the profits by a sinking fund, which is kept up by laying aside 10 cents for every mile traveled. Before one truck is worn out, he has not only paid for its maintenance but has laid enough aside to buy a new one. In fact, his fund now will permit him to purchase five new trucks and the business warrants it, but he cannot find drivers to operate them. He expects that this will be remedied, too, with the assistance of the Department of Labor.

Carrier, Purchasing Agent, Banker

Mr. Barnesly not only acts as the carrier for the people whom he serves but also as their purchasing agent and, to some extent, as their banker. He goes to the store in Washington and buys the goods his patrons want, carries it out to them and delivers it at their door.

He says that his territory could stand one similar truck line for every twelve farmers. His greatest waste of time is picking up his load in the city. He maintains three bank accounts, one a personal one, a second one for other farmers and a third one as a sinking fund for the purchase of new trucks. He has developed a special body for carrying live stock.

Questions as to the attitude of commission men on the inter-city and rural express system brought out the fact that at present the commission men are against the system, because it provides a direct producer to consumer distribution and in reality cuts the commission man out. It does not interfere greatly with parcels post, on account of the rates and the parcel post limit.

Successful operation of motor trucks by Mr. Barnesly is only one of a great number which might be cited in the state of Maryland alone, where on April 1 twenty-three rural express lines with a total daily truck capacity of 75.4 tons and 1588 miles were in operation. Just why rural motor truck express routes should have developed more quickly in Maryland than in other states is not known unless it be that Maryland is largely agricultural and without suitable transportation facilities in a great number of the most productive territories.

Washington is suffering from a lack of adequate green goods foods because of the fact that it has close to 100,000 more people now than on the corresponding date of last year. Already many of the Maryland routes are running into Washington and other routes are being established from the rich farming sections of Virginia.

The Maryland Franchise

Mr. Barnesly's route is operated under a license granted by the Maryland Public Commission. He has the exclusive franchise for hauling goods between Olney and Washington, but is bonded to the extent of \$5,000 to provide sufficient motor truck capacity to care for all of the express matter offered for handling. If this should become greater than the present number of trucks, he would have to increase the size of his fleet or give up the franchise to some other concern which could satisfactorily perform the work.

While the exclusive franchise has the advantages of placing the responsibility for the service upon one instead of many companies and of preventing unfair competition and rate cutting beyond figures commensurate with a necessary margin of profit, it opens the way to a monopoly which in the end may abuse its privilege.

For instance, one private motor truck owner who recently attempted to haul food products from the vicinity of Baltimore to the Washington, D. C., commission merchant was intimidated and threatened with arrest by the concern which had the exclusive franchise between the two cities.

The fact that the private individual had secured orders for goods not already handled by the concern having the exclusive franchise showed that there was considerable business which could be handled by motor trucks which was not now being carried in that manner.

Conditions surrounding the cities of Baltimore and Washington are not at all exceptional, for practically every large city receives a large amount of fresh food products which are to-day shipped by railroad express or interurban trolleys by a round-about route when they could be handled more directly, more cheaply and more quickly by means of rural motor truck express routes. For instance, Chicago is surrounded by a great agricultural area from which food products could be secured more directly by rural express trucks than by any other means.

Needed in Other Localities

Similarly, New York, Boston, Philadelphia and other coast cities could be supplied with food raised in the immediate vicinity and thereby eliminate entirely the great waste which now exists in the duplicate transportation of goods raised in one state to far distant states, when the same goods raised in the latter states are shipped great distances to the first state. For instance, it has been known through investigation, apples grown in New York state were shipped to California for consumption, while other apples raised in California were being shipped to New York.

Dairy products are among the chief sources of profits for the rural expressman. This farmer carries milk from his farm and from those of twelve neighbors 26 mi. each day. In four years, he has lost one can

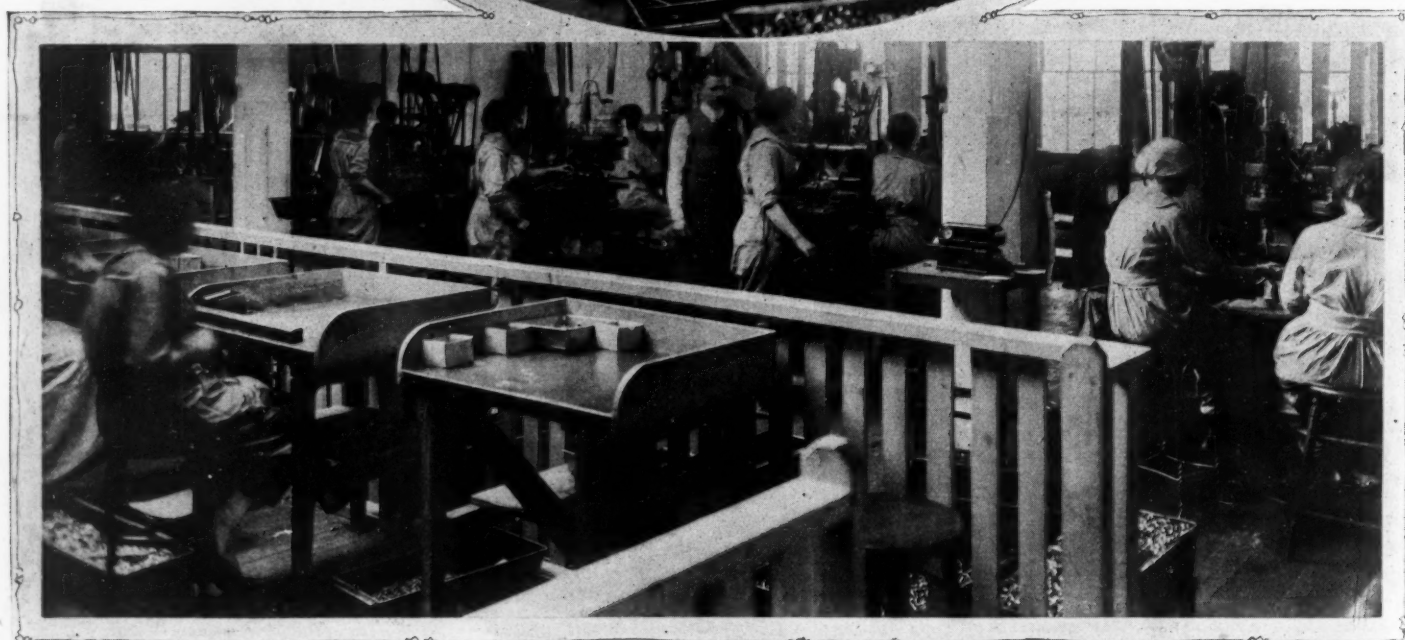


Women Twice as Efficient as Men Here



With excellent lighting, a bonus system of payment and company provisions whereby protective garments are provided for them, the woman workers at the factory of the Hill Pump Valve Co., Chicago, find their new jobs much to be preferred to many other kinds of work. At the left they are shown in Dept. B, where they operate speed lathes

Women are employed in every department at this factory except one. In the oval a section of the inspection department is seen, while below women are operating tapping, drilling and milling machines. A restroom is provided



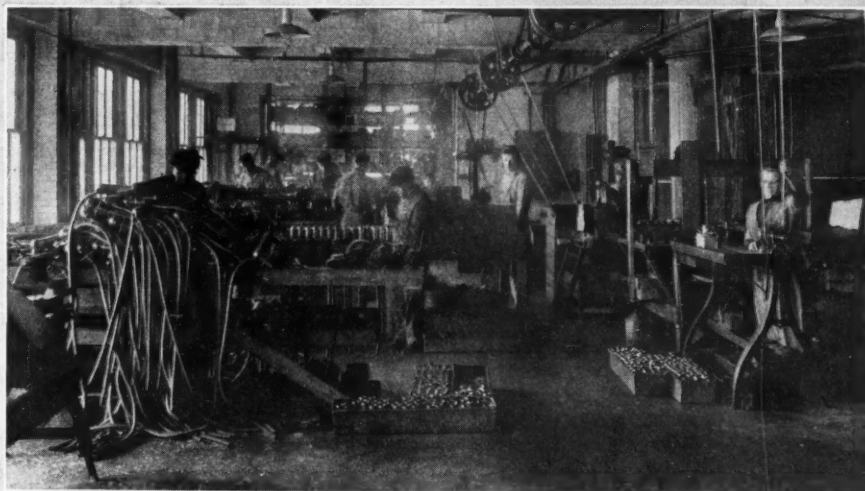


Two women are employed in somewhat unusual work in one department, the foundry. The results from their labor here are surprisingly efficient even though the foundry is a very difficult place in which to work and they must keep pace with the work of the rest of the employees here, who are men. However, the experience of the Hill Pump Valve Co. is that a woman can be trained to do the same work a man does in their line within three weeks, and to do it much more efficiently

A CHICAGO manufacturer employed its first woman operator entirely as an experiment. The woman was wholly unfamiliar with machinery, had never done work of this character and otherwise seemed unsuited to the job. In three weeks she was turning out 302 per cent of the work done by a skilled mechanic before her. To-day women in that factory are operating speed lathes, tapping, drilling and milling machines and even automatic screw machines. The average efficiency is 100 per cent over that of previous workers, and the average is obtained after about three weeks' training.

This record was not made without effort on the part of the employer. There was one man in the organization at the beginning of the experiment who favored the employment of women in the different manufacturing processes. Now all are sold to the idea.

Care was taken to instruct the women in operating machines. Two women are employed as forewomen, one in the speed lathe department, another in the depart-



Above is a part of the assembling department. This company makes automatic screw machine products of all kinds in brass or steel. A well equipped foundry makes it possible for them to turn out rough or machined brass and bronze castings. They have met the labor shortage through the employment of women, the result of which has been on an average 100 per cent increase in efficiency

ment of the tapping, drilling and milling machines.

The lighting is excellent. Cooper-Hewitt lights are employed. A restroom is provided for the women. Overalls are furnished by the company. Some of the women wear caps to protect their hair, though they are not required to do this.

The experience of this concern, illustrations from whose factory appear on these pages, is one that countless factories are having in these war times. Though this company also tried the employment of

women as an experiment, like many other similar concerns, it proved so successful it does not fear a shortage of labor as long as it can obtain others of the same class.

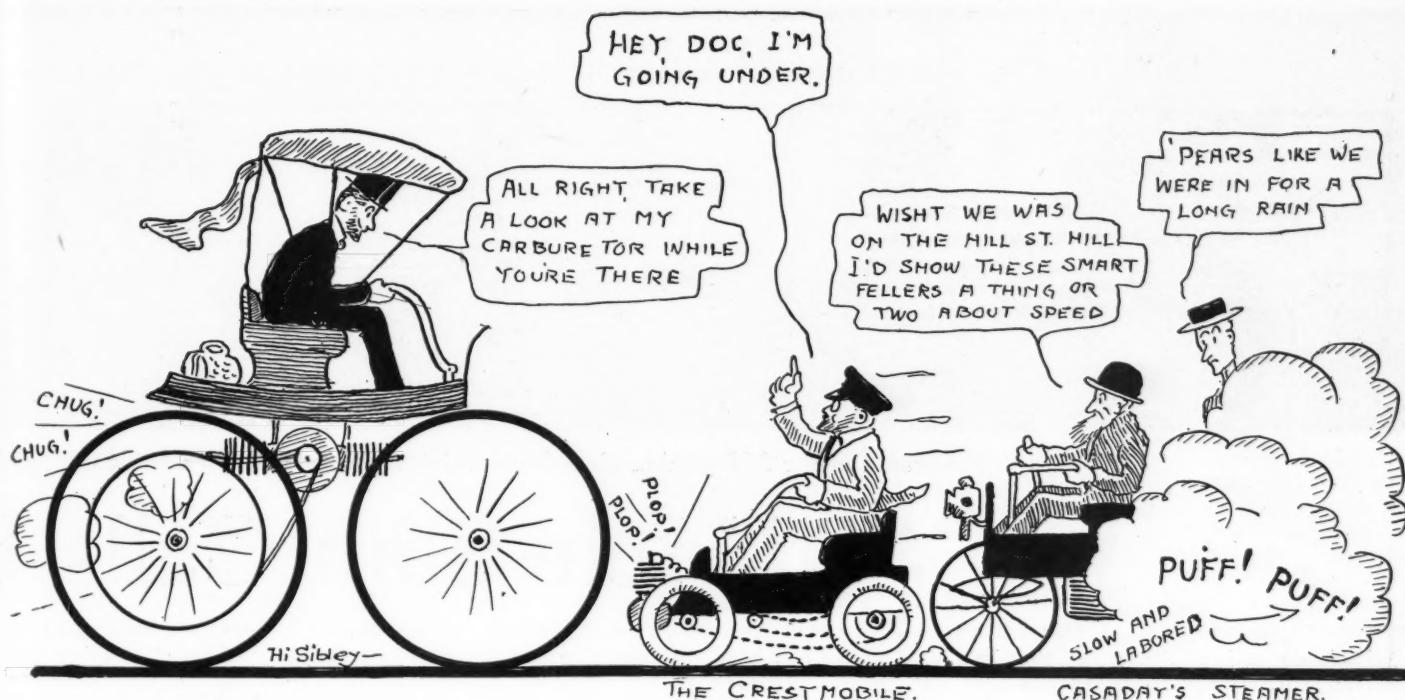
CLUB STARTS TRUCK DIVISION

Detroit, May 10—The Detroit Automobile Club has formed a commercial car division in which truck interests will be coordinated for safety and betterment. Good roads, city ordinances, safety first, transportation legislation, etc., as connected with the motor truck will be considered.



WOULD you see the eyes of whole nations well up with tears of gratefulness at the mention of a name? Then ask the people of devastated Belgium, Serbia, Roumania, of northern France and northern Italy, about the American Red Cross. This organization has to its credit a glorious achievement unmatched in history. During the last year \$100,000,000 was spent. Our Red Cross will ask us soon again for another \$100,000,000 to help heal a bleeding world's wounds. Will you and I "come across" generously? Certainly we will! Through the Red Cross the United States is making friends for all eternity.

NATIONAL SERVICE
THE ART INSTITUTE
OF CHICAGO



Tales of the Alley Rats—No. 6

The Petulant Pioneers

By Hi Sibley

This is the sixth and last of a series of articles based on the stories told by Captain Manlove A. Shuey, or Cap, as he is more often known, a pioneer dealer whose tales are of the early days, when a dealer's life was very extraordinary indeed. The latest of the series was "Cap, Hank and Ford No. 3," which has to do with one of the very early Fords, the third of which the captain claims to have sold.

AN animated discussion of the relative merits of wire and wood wheels was in full sway at the regular evening session of Alley Rats. The subject had been pretty well frazzled out when the venerable Chris Soens entered. He made his way to one of the more comfortable of the decrepit chairs reserved, by tacit understanding, for the older Rats and, settling himself comfortably, addressed the last spokesman:

"What you just said in favor of wood wheels may be true enough, Duey, but I hold that wire wheels will outlast all of 'em. There's that little Rambler of mine—still running, by the way—that I bought back in 1902 before wood wheels were thought of. These wheels are going to outlive all the rest of her machinery."

"You still runnin' that little wagon, Chris?" put in Cap Shuey, host and proprietor of the snug little garage known as the Rats' Nest, and who up to this time had been patching an inner tube. "Well, well, who'd a thunk! I s'posed you'd burned it long ago."

"Yep, still running, Cap," Chris replied, "though she's getting a bit croupy and rheumatic, and I guess I'll have to turn her out to her last pasture soon."

"Why, that little scoot-about was borned way back about the time the toboggan-dash Oldsmobile came to light," Cap went on, refreshing himself with the

customary pinch of Fast Mail. "Dear me, suz, how things have changed. Nowadays a feller has self-starters and cigar lighters and demountable rims and half of 'em don't know whether their car runs by compressed air or by a spring, because they never have to look under the hood to find out, and they let out a beller every time they strike a road that ain't as smooth as a bowling alley. But fifteen years ago we had our trails aplenty."

"I remember the little Oldsmobile well enough, because I sold 'em. Had a powerful four-and-a-half horse engine, but the builders put out a dos-a-dos seat so's she could carry four to hold her down to a safe pace. Fenders was among the extr'y accessories, and the little bike lamp they used would show up a bump just in time to scare you like thunder but not soon enough to slow up for it. We didn't have no fair weather sports in them days, and the boys used to unbuckle the muffler and start out for St. Joe in the rain many a time. You remember what the Michigan roads was then, sand and clay and corduroy."

Rotary Steam Engine

"But speakin' of the early cars, old man Casaday beat us all to it with that one he built himself—you remember it, Uncle Bill—had a rotary steam engine of his own design. It managed to wiggle along on a down grade if the road was smooth, but the main failin' seemed to be that the steam refused to stay in the biler until called for."

"That contraption crawled down the street in a cloud of vapor like that nebular hypothesis Doc Whitehall was tellin' about. Folks along Colfax avenue used to say it

always rained for three days after Casaday's chariot had passed."

"When the gas cars first come in they were as many styles as they is hairs on a pup—two-cycle, four-cycle, some with three cylinders, engines under the seat, and over the axle, cylinders upright, horizontal, crosswise and upside down. Horace Kauffman fell for a rare combination in the old Santos-Dumont—a price tag of \$1,500 and cast-iron transmission gears. Most of 'em had the pump handle steering gear that registered every road hump and bump in the driver's canal zone."

"Joe Frazier could tell you more'n I can about Jimmy Studebaker's Winton phaeton, because he says he's been on his back under it in every street in town, thereby gaining an intimate and personal acquaintance with its vitals. There was a monstrous carburetor that looked like a stove pipe with the cramps and a big square water tank built around the cylinder for a jacket and a flywheel with enough heft to carry the whole works through a stone wall, once it got started. Seems to me Jimmy did penetrate the sacred confines of other folks property now and then when the steering gear went back on him."

"But the strangest animal that ever roamed our streets was that long-legged Holsman that Doc Myers had. A two-cylinder alleged air-cooled engine coupled to four big round buggy wheels. I think there was a seat on it some'eres, but it was a lean and hungry lookin' beast. Once in a while when Doc was going down hill one of the slack transmission belts would drop off, and he'd never know the difference until he started up the other side. There was

(Concluded on page 29)



Panorama of the 265 garden plots from which the employees of a tire company last year

Uncle Sam Calls for M

THE Department of Agriculture at Washington is of the opinion that war gardens will be more necessary this year than ever, if we are to win the war and have sufficient food for ourselves and our Allies. The motor industry, as a whole and individually, is doing no little to bring such a condition about. Many companies in the industry have provided ample space for employees' war gardens and even gone so far as to break up, or plow, the ground set aside for this purpose.

Movement Has Grown

MOTOR AGE has reported the efforts of various companies along this line before. The movement made by different factories to provide garden facilities last year and this is at its strongest now, in the second year of the war when it is recognized as it could not be before that on food production depends so much of the outcome of the war.

The instance of the Firestone Tire & Rubber Co. is one which might serve as an indication of the service the industry is rendering in this as well as in other ways. It is hard to estimate the value of war gardens planted in America last year. The National Food Administration, however, is sponsor for the statement that there can be no doubt that they were an important factor in bringing us through the winter without greater privations than actually were undergone as a result of weather and transportation conditions. The Food Administration is urging that every available acre be planted this year. The purpose of this is not only to increase the supply of food we will have on hand next fall but to relieve the burden upon the railroad system and to make communities as nearly as possible self-supporting in their food supplies.

War gardens planted by schools, communities and employees of large concerns, such as in the motor industry, are commended especially. The public is being urged and even entreated to make up the bulk of its diet from the fresh fruits and vegetables so that the consumption of the staple grains and meat and fat may be less.

The grounds illustrated here were divided into 265 plots, all of which had been plowed and prepared for planting. A shed

was erected for the tools, a time clock was put in the tool house to keep a record of the efforts expended in the work, and a close check was kept throughout of the cost of seeds, time put in and final results. Seeds were sold at cost. The produce from the gardens was checked, weighed and recorded at current retail prices. The results showed that 15,313 hr. had been spent by workers in the gardens, or 57 hr. to a garden, and products to the value of \$14,205.59, according to retail prices, had been raised. Counting out the cost of the seeds, \$500.17; labor, watchmen and plowing, \$2,390.17; with miscellaneous expenses of \$134.22; the net value of the twenty-three weeks spent in the work totaled \$11,181.03. The average number of hours spent by a man each week was 2 hr. 29 min., and the average value of the products from each of the 265 gardens was \$53.60.

The individual with only a backyard garden can accomplish just as much as the Firestone gardeners did. The Department

of Agriculture is more than anxious to give assistance in this movement and has prepared several bulletins which are available without charge. A postal card addressed to the Division of Publications, U. S. Department of Agriculture, Washington, D. C., will bring without charge any of the following bulletins, applicable to your section:

Bulletins for Gardener

Farmers' Bulletin No. 936, "The City and Suburban Vegetable Garden"; Farmers' Bulletin No. 937, "The Farm Garden in the North"; Farmers' Bulletin No. 934, "Home Gardening in the South"; Farmers' Bulletin No. 856, "Control of Diseases and Insect Enemies of the Home Vegetable Garden"; Farmers' Bulletin No. 879, "Home Storage of Vegetables."

ENGLISH MIDNIGHT MOTORS

London, England, April 20—The cars of the City of London Motor Volunteers night after night meet with its fleet of motor



War garden results—War products on display at Summit County fair



last year realized \$14,205.59 in garden products at an average expenditure of 57 hours each

for More War Gardening

trucks and cars the trains that begin coming in at midnight and transport free from station to station soldiers and sailors on leave. Hundreds arrive at dead of night, tired, hungry and, for the most part, strangers to London. At midnight London is pitch black, often times wet, without omnibuses, trams, tubes or any means of transit whatever.

The corps cares for the men. Resthouses furnish meals or beds, and motor cars or trucks take them to their next train. The cars are maintained entirely by the owner-drivers, and trucks are lent by business concerns.

TALES OF THE ALLEY RATS

(Concluded from page 27)

some advantage in that buggy, though, because it was so high up and had so much clearance Doc could straddle and pass over any ordinary obstruction, like a traffic cop or a load of hay.

"Doc Stoltz went to the other extreme with that little Crestmobile, that wan't no bigger'n a perambulator. It was so small and low that he could almost pass under a freight train and didn't have to have no garage—just trundled it up in his yard and threw his hat over it for the night. Had a little bike engine on the dash, and for transmission there was about 20 yd. of chain strung under the body and so close to the ground that it picked up everything loose in the streets, like a carpet sweeper. Had a self-starter, too; a strap you worked on like a pulmotor.

"When the Pope-Toledos came to town we got a chance to git a little rest, because the engine was under the hood where a fellow could stand up to work on it, like a gentleman. They was made two-, three- and four-cylinder, and sold at \$1,000 a cylinder. Had a cast-iron one-piece hood with a fillgree panel in the side to let the noise out so's it wouldn't jim the gears. Pretty good lookin' bus for them days, though.

\$1,000 a Cylinder

"When Doc Pine was learnin' to drive his one-cylinder Packard—same model as 'old Pacific' that Tom Fetch drove across the continent—folks kept their children and pet dogs pretty close to home, be-

cause they wan't safe any more'n if they was a tornado loose. Doc took off the corner stone of the Oliver block one night along with a section of iron fence and never hurt his car a bit, and before that he started into my geridge once and brought the door in with him, around his neck.

"Yessir, we had might excitin' times in those days, but now a feller never has a real adventure with a car like we used to. Of course, once in a while a man'll try to push a freight train off the track, but it never works out successfully. Lots has tried to, but they all regret it."

WELCH TO BUILD BODIES

Kansas City, Mo., May 10—C. J. Welch has organized the Western Trailer Co. here and has begun business as motor truck and commercial body builder and motor



"The War Garden Smile"

transportation engineer. Mr. Welch is president and general manager of the company. H. P. Welle has been employed as efficiency engineer on construction, and A. S. Page is consulting engineer on trailers and bodies. Jack Welch is widely known and for 15 years was a racing driver. His last race was in a Marmon at Santa Monica two years ago. Mr. Welch has been at various times general foreman of the Pope-Toledo factory, where he started racing; sales manager of the old Abbott-Detroit company; in the engineering department of the Packard company; sales manager for Stearns-Knight and in the factory of Winton.

TRAINING EMPLOYMENT MANAGERS

Washington, May 10—Twenty prospective employment managers, sent by makers with war contracts, including shipbuilding plant and Government department, are undergoing six weeks' intensive training in the theory and practice of employment management at the University of Rochester under Government auspices. The course is at the express request of the industrial service sections of the several departments at Washington, and the course is to be repeated elsewhere.

So interested are the Government departments in the work the Department of Labor is sending two of its field agents in the Federal employment service, and the Navy is sending assistant superintendents from the Navy Yards, who later may be assigned to employment work there.

TO MAKE NEW TRUCK

Detroit, May 10—The Power Truck & Tractor Co. has been incorporated with a capital stock of \$2,500,000 to manufacture 1-, 2-, 3½- and 5-ton trucks. Standard units will be used. The company will also manufacture two tractor models. The 1-ton truck the company has adopted is being placed on the market, having been in use the last year and a half. The personnel of the company will be announced later. A factory building has been purchased in Detroit with facilities for turning out several thousand trucks and tractors per year. The company plans to build 3000 trucks and 3000 tractors this year.

War Motoring in France

Land of Lafayette Has Eliminated Operation of Thousands of Private Cars but Business Still Requires Extensive Use

By W. F. Bradley

Motor Age Special Correspondent with the Armies in France

FRANCE has cut out private motoring with a cut so clean and sharp that there are some thousands of private owners whose cars are as useless to them as if they were minus cylinders or wheels. In imposing this restriction on civilians the authorities claim that the gasoline shortage is so acute that not one single drop must be used unnecessarily. Thus the ordinary man, no matter what his means, is unable to purchase any kind of fuel fit to put into a motor car tank. As a further precaution, and to prevent supplies getting into unauthorized hands, police and military are stationed at various points around the city of Paris with authority to stop all cars, whether private or military, and inquire into the business of those aboard.

Cars Still Operate

It is wonderful testimony to the utility of the motor car that despite these severe regulations the number of cars on the streets is so great that strangers have difficulty in believing that conditions are not normal. It is recognized, for instance, that the state cannot afford to allow an important engineer, a works manager, or a leading official to waste time walking or waiting for trolley cars to the detriment of war work. The army has to supply such men with gasoline, and it considers that provision just as important as the supplying of an artillery tractor or an ammunition truck. In a country where the only industry is that of war it is sometimes difficult to determine who is not entitled to use a motor car. The general rule, therefore, is that the connection with war industries must be direct before a gasoline allowance can be made, and given an allowance steps must be taken to prevent the fuel being used for illegitimate purposes. With this latter object in view, travel passes have been instituted. These define the district in which the car can be operated, and any person found outside that district is liable to prosecution.

Gasoline is the only fuel available, and the whole of this is in the hands of the military authorities, who distribute it as they consider fit. Coal gas, which is being made use of to a certain extent in England, is not obtainable in France. Benzol and alcohol, which were used considerably before the war, particularly on trucks, have been requisitioned for the making of explosives, not a drop being purchasable for any purpose by private individuals.

All the motor activity of Paris and district is military or of a semi-military character. While Allied armies are kept as far away from the city as possible, there is an amazing variety of cars belonging to the American, British, Italian, Portugese and French armies, giving to Paris a cosmopolitan air it never enjoyed even in peace times. There is plenty of variety about the motor car vehicles, for they pass

through the whole scale from the Ford, the powerful staff car, heavy quartermaster trucks, aviation fast trucks and trailers, trucks towing airplane fuselages on their own wheels, heavy French four-wheel-drive tractors hauling big guns on special motor car-type gun carriages and miscellaneous ambulances.

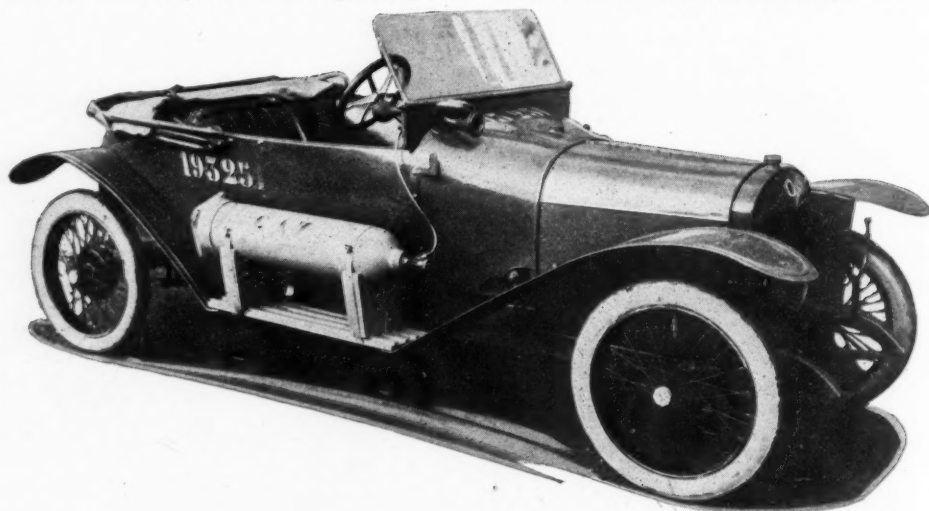
Officially Paris is not in the war zone, and its inhabitants smile at the suggestion of the Germans getting within range of the city; nevertheless the war dominates everything and forces itself upon attention at every moment. There exists the most varied selection of uniforms the world has ever seen; the railroad depots are filled with soldiers of every Allied nation, and there is enough aerial activity to make the newly-arrived stranger realize that he is living next door to the war zone. Most of the airplanes flying over the city are the Paris guard which patrol the air just as the policeman down below patrols his area. Others are new machines being delivered from the factory to the military flying ground or passing from one military aviation ground to another. Just outside the city, above the ground used for motor car testing since the beginning of the French motor car industry, airplanes now are being tested in such numbers that it is no common sight to see thirty machines aloft at once.

Naturally all flying is of military nature, but much of the aerial travel is disconnected with actual fighting. It is common, for instance, for officers of the various armies to make visits to distant parts of the fronts by airplanes. There is a considerable aerial traffic between Paris and London, while England sends all her machines into France by the aerial way. This is the only way some very big span planes can be delivered, for it is impossible to

pass the wings through tunnels and under bridges. Up to the present only military or government officials make trip by airplane between Paris and London, but some leading manufacturers working for the army and having business connections with the two cities are anxious to be allowed to make use of the air service between the two centers. There is no logical reason why an airplane manufacturer in Paris, who also has works in some part of England, should not fly over with one of his machines, thus accomplishing in 3 hr. a journey which occupies from 18 to 24 by railroad and steamer. If this has not been done except in very special circumstances, it is because of the police and military regulations which surround all traveling and the fear, on the part of the authorities, that if a civilian flying service were instituted there would be no control over the travelers. It is certain, however, that busy army contractors will not wait until the end of the war to obtain this necessary time-saving measure.

Two Bus Lines

Before the war Parisians relied about equally on motor buses, electric surface lines and subway lines for communication. For nearly three years the city was without a single one of its normal fleet of 1000 motor buses. At the present time there are only two lines of motor buses in service, the fleet being not more than thirty strong. It has been impossible to put more into service, partly owing to the shortage of fuel but more largely on account of the difficulty of manufacturing more vehicles. The omnibus company having a monopoly of the Paris service produces practically all its own vehicles, the chassis being assembled from components obtained from the various motor car factories and the bodies being built entirely in the shops of the



Here is how a French car has been adapted to run on coal gas. A metal container is carried on the runningboard

omnibus company. Since the war the production of motor buses by the bus company has been intensified, but instead of the vehicles going on the streets of the city they are taken by the military authorities and sent to the front, where they are used for the rapid transportation of troops and for delivery of fresh meat. It was only because they were able to get ahead of their production program that the company was allowed to put the present thirty buses into city service. Although operating costs have increased considerably since the war, fares have remained the same, the company being under a contract with Paris to run the buses at certain fixed fares, which cannot be modified without permission during the period of the contract.

Fewer Paris Taxis

Paris taxicabs have decreased in number from 8000 before the war to about 3000. Before the war the rate of fares applied by 75 per cent of the Paris taxicabs was 30 cents per mile; about 25 per cent ran at 15 cents a mile, and the remainder at 40 cents a mile. At the present time no cabs are operating at less than 40 cents a mile. All these cabs are two-cylinder models built before the war, in very poor mechanical condition, and generally driven by men of little experience.

Before the war France possessed 160,000 motor vehicles, exclusive of motorcycles. Of this number 115,000 were touring cars. At least 80 per cent of these touring cars either have been requisitioned by the military authorities or are lying idle. There are no definite figures on the number of trucks in service; immediately on the outbreak of war their numbers dropped considerably, but during the last twelve months a considerable increase has been made necessary by the urgency of transport and the loss of horses and mules, the former having decreased in number 31 per cent, and the latter 14 per cent, between 1913 and 1916. Since this latter year the decrease has continued on an important scale. It is certain that as soon as the home factories can supply or importations are allowed there will be an unprecedented increase in the number of motor trucks in private service in France.

Owing to the lowered means of transportation many public bodies have been obliged to call on the army from time to time for truckage. On more than one occasion army trucks have had to respond to an all-night hurry call to distribute to the bakeries the flour required for the next day's bread supply. Because of the loss of horses and the consequent inability of getting private contractors to undertake haulage, the Paris municipality has purchased and put into service 100 Pierce-Arrow 5-ton trucks and 100 Fiat 3½-ton trucks. These are used for distributing flour, coal, wood and general food supplies and also for the collection of household refuse at times when the electric truck service is not adequate.

One of the greatest difficulties the Paris authorities have had to contend with since putting these trucks into service has been the supply of competent drivers. An appeal was made to the army authorities for some of the older men to be released from the motor car service, but without result. It was impossible to get together more

than a dozen men having had experience as truck drivers, and even these were men who had been discharged as unfit for further service in the army. Consequently the municipality decided to make use of its own employees and to train women. A school was formed, the pupils first of all being given instruction on light trucks rented from the army; after a little experience on these the women were put on motor street sweepers, then finally given a Pierce-Arrow or a Fiat. It was predicted that the result of training women as truck drivers would be disastrous, but by a careful selection and by taking only women who have been used to heavy physical work all their lives fairly satisfactory results have been obtained. Now the most serious difficulty is not in obtaining drivers but in getting competent mechanics for the maintenance of the trucks.

In addition to making use of these trucks for purely municipal service, the Paris authorities rent them out to contractors and others whenever they can be spared. The cost to the municipality is calculated at \$9.40 per day for a 5-ton Pierce-Arrow, plus 28 cents for every kilometer run. The 3½-ton Fiats cost \$8.40 per day, plus 22 cents per kilometer. To these prices a

profit of 15 per cent is added for the benefit of the municipality.

Apart from the Paris municipality women drivers have not been employed to any extent in the French service. There are no cases of private firms using women chauffeurs. The army officially has admitted women to drive light trucks, touring cars and ambulances, but the experiment has not been a great success, and the fact that a man nearly always is attached to the car at the same time to crank it, wash it and attend to it mechanically makes the change one of very doubtful economy. Attempts have been made by the army to employ Asiatic troops as truck drivers with very unsatisfactory results. After a long training in the army schools the inefficiency of these men was revealed by an accident list 50 per cent greater than that shown by the worst European drivers. It was after this experience, and still with a view to economy of labor, that women were admitted to drive army cars.

Ninety per cent of the motor car stores of Paris are closed or have been loaned to charitable institutions. The few that are open show pre-war cars or chassis, but nobody is left in attendance to answer queries if any should be made.

Routes and Touring Information

Fort Smith, Ark.—Denver, Col.

FORT Smith, Ark.—Would like route from Fort Smith, Ark., to Denver, Col.—Guy E. Williams.

From Fort Smith drive to Winslow, Fayetteville, Siloam Springs, Sulphur Springs, Anderson, Joplin, Columbus, Oswego, Independence, Sedan, Cedarvale, Winfield, Wichita, Colwich, Haven, Hutchinson. From Hutchinson follow the Santa Fe trail to Pueblo via St. John, Macksville, Kingsley, Spearville, Dodge City, Cimarron, Deerfield, Lakin, Syracuse, Coolidge, Kan., Granada, Hasty, La Junta, Rocky Ford and Manzanola. From Pueblo take the Midland trail to Denver, via Fountain, Colorado Springs, Pike View, Palmer Lake, Castle Rock and Littleton. The mileage is approximately 797.

Kansas City, Mo.—San Diego, Cal.

Kansas City, Mo.—Would like to know best route from Kansas City, Mo., to San Diego, Cal., what kind of roads and mileage. Would you advise Santa Fe trail or Lincoln highway.—Charles T. Putman.

The first route we would suggest for your trip is via the Santa Fe and National Old Trails. This is the most direct, but would be very warm during the summer. Drive west to Waldo, Overland Park, Kan., Olathe, Ot-

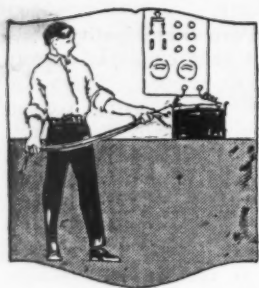
tawa, Waverly, Emporia, Florence, Peabody, Newton, Hutchinson, Nickerson, Sterling, Lyons, Great Bend, Larned, Dodge City, Cimarron, Garden City, Syracuse, Coolidge, Holly, Col., Granada, Lamar, Las Animas, La Junta, Rocky Ford, Pueblo. At Pueblo go south through Walsenburg, Trinidad, Raton, N. M., Springer, Wagon Mound, Watrous, Las Vegas, Pecos, Canoncito, Santa Fe, Alameda, Albuquerque, Kirkpatrick Spring, Becker, Socorro. At Socorro go west through Magdalena and Quemando to Springerville. At Springerville go northwest through St. Johns, Concho, Holbrook, Winslow, Flagstaff, Williams, Ashfork, Seligman, Hackberry to Kingman, west to Los Angeles, through Yucca, Needles, Barstow, San Bernardino, Rialto, Monrovia, Lamanda Park, Pasadena and Bairdstown. From Los Angeles follow the Pacific highway to San Diego through Santa Ana, San Juan Capistrano, Oceanside, Encinitas and La Jolla. The mileage is approximately 2180.

The option, by the Lincoln highway, is somewhat longer, as follows:

Full directions will be found in Vols. 5, 7 and 8 of the Automobile Blue Book, published by the Automobile Blue Book Publishing Co., Chicago. Price, \$3 per volume.

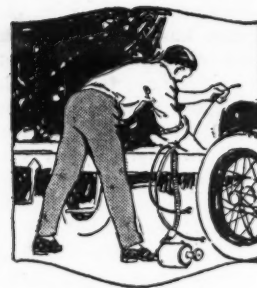


Recommended route as best for tourists from Toledo to Pittsburgh or from Detroit east



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the ninety-fifth installment of a weekly series of articles begun in MOTOR AGE, issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York.

A thorough explanation of the fundamentals of electric circuits preceded descriptions of the general types of starting, lighting and ignition apparatus, signalling devices, magnetic transmissions, etc. This is being followed by the installation, care and repair of individual systems, beginning with the special equipment for Fords.

Part XCV—Genemotor System for Ford Cars—Continued

REMOVE the generator pulley as a unit with the internal spring to prevent possibility of changing the spring adjustment. Care should be taken that the slot in the spring support, into which the forks of the pinion assemble, clears the key. These can be brought into line by holding the pinion and turning the fan pulley in a counter-clockwise direction.

Mount the Genemotor in place and fasten the clamping strap loosely. Apply a straight edge, Fig. 521, and align the sprockets accurately, making sure that the Genemotor shaft is parallel to the crankshaft and that the pinion on the Genemotor shaft, with bushing, is pressed against the ball bearing. In adjusting the chain allow a small amount of slack. Something like $\frac{3}{8}$ inch deflection under finger pressure should be allowed. Adjustment of the chain is made by the two set screws K, Fig. 519. When such an adjustment is made be sure that the starting switch is in an upright position on top of the unit, and then tighten the clamping strap. The chain should be greased thoroughly and the chain guard L fastened in position. Replace the pulley, with spring, locking it with the pinion as when received.

The special clamp pulley now should be assembled on the regular fan pulley, reducing the diameter of the flanges of the latter if necessary by filing. Replace the fan and the bracket O, Fig. 519, on the engine, and if the fan blades do not clear the

pulley on the end of the genemotor shaft, twist them slightly with a wrench and bend out the tips of the blades. Put on the regular fan belt but do not adjust it too tightly. Replace the timer rod, making sure it clears the chain by bending the rod if necessary. The engine now should be turned over by hand to make sure the chain is perfectly free, and it is advisable to run the engine for a few minutes before replacing the radiator and other parts to determine if the alignment and clearances seem correct.

The dashboard is to be drilled for the lighting switch Q, Fig. 519, on the right-hand side as viewed from the seat, directly under the gasoline supply adjustment for the carburetor, and on the left-hand side close to the coil box for the starting switch rod R. In some models, such as the sedan and coupelet, the lighting switch may be placed on the upper left-hand corner of the vertical board under the driver's seat, or it may be mounted on the dash close to the speedometer. Mount the primer lever as in Fig. 519 by placing the special washer under the second manifold stud nut, passing the original rod to the dash board.

Chain-Drive Genemotor Wiring

All the various leads are marked for their proper connection, and by reference to the wiring diagram in Fig. 522 the various connections may be followed readily.

The battery box should be mounted on the right-hand running-board in such a position that it does not interfere with the doors to the car. The battery box should be so located with respect to the running-board that the holes in the bottom of the box



Fig. 521—Method of checking adjustment of the driving chain

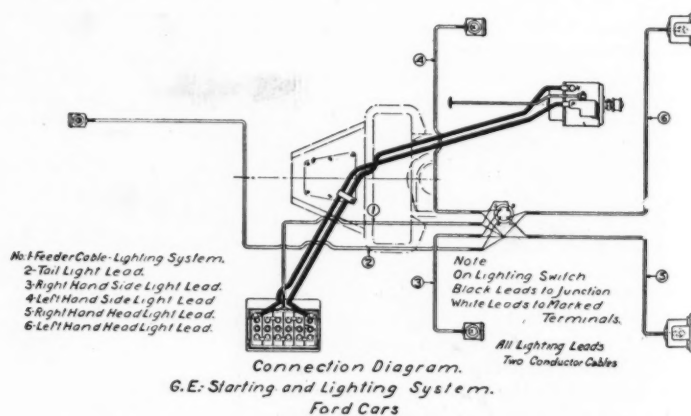


Fig. 522—Wiring diagram of the chain-drive Genemotor system for the Ford car

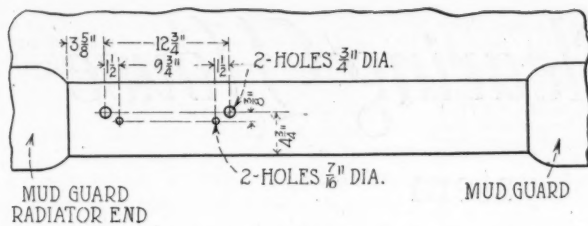


Fig. 524—Location of holes on left-hand runningboard for mounting storage box with improved chain-drive Genemotor

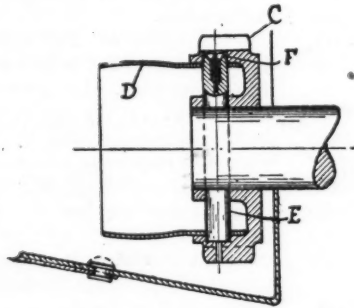


Fig. 523—Method of mounting driving gear and fan pulley on crankshaft

overhang the running-board shield, through which a new hole should be cut and the battery leads placed after being protected with circular loom and tape. The battery box is to be held down firmly to the running-board by two special clamps. These clamps fasten to the handles of the battery box and pass down through the holes in the running-board.

The motor leads shipped with the outfit are to run diagonally across the transmission case of the engine from the Genemotor to the battery. These leads are to be secured in place by the steel clip furnished with the outfit. This clip is to be fastened under the right-hand screw next to the dash, holding the transmission cover in place. After the wiring is complete connect the negative battery lead to the battery permanently. Before connecting the positive lead touch it to the battery terminal with all switches off and observe if there is any spark on breaking the connection. If no spark occurs a permanent connection may be made, while if a spark does occur the difficulty should be corrected before making a permanent connection.

Turn the engine over by hand to see that everything is clear. If found O. K. the machine is ready for test. On the 1915 and subsequent models, on which the headlights are electric and operated from the magneto, it will be necessary to discard the wiring and switch connections and do away with the ground connection of the left-hand lamp, as the Genemotor system is of the two-wire type throughout and all the lamps are fed from the storage battery through a lighting switch provided with the system.

Improved Chain-Drive Genemotor

In the improved type of the chain-drive Genemotor the fan is driven directly from a special pulley mounted on the crankshaft at the same time the driving gear is mounted, Fig. 523. The starting switch and cutout instead of being mounted on top of the Genemotor and in combination with each other, are made to be mounted on the under side of the floor board and directly in front of the heel board. The proper location of the holes and their proper size for mounting the starting switch and cutout are given in Fig. 514. The lighting switch is made to be mounted on the steering column. The location and size of the holes that must be drilled in the running-board to accommodate the battery cables and mounting clamps are given in Fig. 524. A complete wiring diagram of the system is shown in Fig. 517.

The Genemotor is a single-unit outfit, that is, the same machine performs the functions of both generator and starting motor. Regulation of the output is accomplished by the third-brush method.

Lubricate the ball bearings at the end of the Genemotor with a few drops of non-acid oil every 1000 miles. Grease the chain every 500 miles and keep taking up the slack as the chain stretches and the links seat themselves in the sprockets. Do not use any lubricants containing any solid matter in greasing the chain, as this will produce excessive wear. If the chain becomes gummy, it should be cleaned by brushing with kerosene and then lubricated by rubbing a good quality of cup grease on the inside surface of the chain.

If the commutator becomes dirty clean it thoroughly, and if it should become roughened obtain a small piece of fine sandpaper and smooth it down. The sandpaper should not be coarser than 00.

Under no conditions try to operate the Genemotor with the battery removed unless the two generator terminals first are connected together with a copper wire or cable, otherwise the Genemotor will over-heat and perhaps seriously damage the windings. The lights cannot be used with the battery removed. Never try to operate the Genemotor with the small regulating brush removed or with its contact surface on the commutator reduced, as normal charging current cannot be procured. The starting motor is supposed to spin the engine at sufficient speed to secure ignition from the magneto. If the engine does not fire promptly, pull the priming rod; if still no success is met with, examine the ignition system and adjustment of the carbureter. Remember the starter supposedly is only intended for cranking the engine. In very cold weather it is advisable to turn the engine over by hand a few times before using the starting motor, thus preventing an excessive drain on the battery.

The Genemotor should give satisfactory results with Ford cars running under normal conditions. If, however, as with any starting and lighting system, the cars habitually are operated on short runs with many stops or at very low speeds, the battery may become discharged by reason of the average charge being less than the requirements for starting and lighting, and special charging of the battery may be necessary.

Examine the height of the electrolyte in the battery at least every two weeks, and add distilled water, if required, to maintain height of electrolyte from $\frac{1}{4}$ inch to $\frac{1}{2}$ inch above the top of the plates. Do not allow battery to stand in discharged condition or be subject to temperatures below freezing in a discharged condition. The battery should be charged occasionally if the car is not in use, and the specific gravity of the electrolyte when fully charged should be approximately 1275 to 1285. Further instructions as to the care of the battery are given in the section on storage batteries.

1918 Chain-Driven Type

The latest model of the Genemotor for the Ford car is a single-unit, two wire, 12-volt equipment. The electrical unit is mounted on the left-hand side of the engine on a special bracket attached to the engine and mechanically connected to the engine crankshaft by a silent chain. The regulation of the generator is by the third-brush method. This system is designed for installation on any 1917 or 1918 Model T Ford car. On earlier cars it will be necessary to fit the engine with a new crankcase having required increase clearness in the nose pan.

Preparation of Engine

The following parts should be carefully removed:

- Radiator with water pipe and elbows.
- Starting crank and ratchet.
- Fan bracket complete.
- Fan drive pulley on engine crankshaft.
- Engines bolts.

The Readers' Clearing House

The Electric System

Wiring of Dort Car

Q.—GIVE wiring diagram of Dort car with Westinghouse starting, lighting and ignition system.—G. H. Smith, Clarksville, Ark.

This diagram is shown in Fig. 4.

Wiring of 1916 Pullman

Q.—Publish a diagram of Appelco electric system used on 1916 Pullman fours.—C. H. Rice, Tuscaloosa, Ala.

This diagram published in the April 28 issue of MOTOR AGE.

No Damage to Lamps

Q.—Can a Gray & Davis generator be used to light the headlights without burning out like a Ford magneto?

2.—Does a battery discharge just as fast with the lights on dim as it would on bright, the engine not running?—P. F. Stahl, Meyersville, Tex.

1.—The Gray & Davis generator is fitted with a third-brush regulating system so that it will not overcharge the battery or be injurious to the lamps.

2.—No.

Magneto on Side

Q.—Can a Bosch D.U.4 magneto be run on its side? By that I mean could I anchor it to the cylinder head and drive it direct from the shaft which operates the Atwater Kent system from the end of camshaft?—Reader, Kalamazoo, Mich.

You could drive the magneto in this position all right, but the latter would be revolving at half crankshaft speed, whereas the magneto on a four-cylinder engine must revolve at crankshaft speed, because four sparks are needed for each two revolutions of the crankshaft.

Advancing and Retarding Spark

Q.—Why is it necessary to advance and retard the spark? When the engine is speeded up does not the timer or magneto shaft keep up in speed with the engine?

2.—What is the difference between dual and duplex ignition?

3.—When a car is run without the battery, in which way would you ground the average generator?

4.—On the latest battery ignition systems does the generator send current direct to the ignition coil at a certain speed? Could the engine be started, if the battery is discharged, just by spinning the engine very fast?—J. Sacks, Chicago.

1.—Spark must be advanced when an engine is speeded up, to give the mixture a full chance to burn. Bear in mind it takes

a certain amount of time for the compressed charge to ignite and the faster you run the engine the farther you must advance the spark. This gives the fuel a chance to ignite when the piston is in the best position to realize the full explosive force of the mixture. When the engine runs very slowly the spark can be retarded, for otherwise the spark takes place before the piston has come to top dead center, resulting in a kick-back.

2.—In the dual system of ignition there are two sources of current and one set of plugs, either source of current being available at any time. In a double ignition system there are two sources of current and two sets of plugs but only one set sparking when the engine is running.

3.—This is accomplished in various ways.

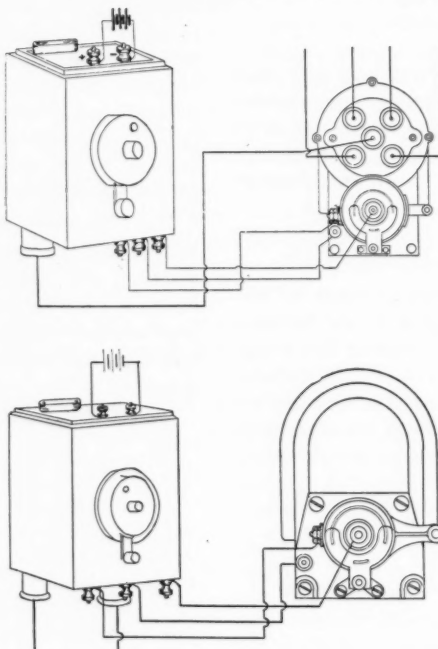


Fig. 1—Wiring diagram of the model D Splugdorf magneto with non-vibrating dash coil

On the Overland, for instance, a piece of copper wire is connected from the generator terminal to one of the small screws in the name plate on the side of the instrument. The generator on most cars also can be thrown out of commission by removing the brushes.

4.—In most of the systems where the lighting generator is in unit with the ignition apparatus, the generator sends current direct to the ignition coil when the engine is running and the storage battery when the engine is not running. The ignition coil transforms the voltage up to the high tension required for the spark plugs. On some systems it may be possible to start the engine by turning it rapidly, but it is not usually possible to turn the engine over fast enough by hand.

Generator on 1910 Car

Q.—Where is the best place for a generator on my model K 1910 Chalmers, and what is the best size for headlights, taillight and speedometer light.—H. Strom, St. Paul, Minn.

This will be determined by the size of the generator. It is always quite a job to fix up an old timer like this with a modern starting and lighting system, and we believe one of the generators incorporated in the fan would be the best for your car. Then you will have to run wires from it to the storage battery and run your lights from the battery. Or, you can run direct from the generator when the engine is running. The bulbs in the headlights can be 6-volt, 21-cp; tail and speedometer lights about 6-volt, 4-cp.

Fires on Two Cylinders

Q.—I have a Corbin 40. This car misses at all speeds above 10 m.p.h. When I speed it up it will only fire on two cylinders. It has Bosch magneto, Connecticut battery system and Rayfield carburetor. The intake manifold is very long, but if it ran all right when it was built this should not make any difference. I ground all the valves, put extra tension on all the valve springs, had the carburetor tested, but it runs the same. I took the magneto off and found that the points separated more on one side than on the other. Could this be the trouble? On setting the spark plug points 1/32 in. the car would miss at all speeds, then when I set them so they were about 1/64 in. or less it would run on two. Why does it fire on four at

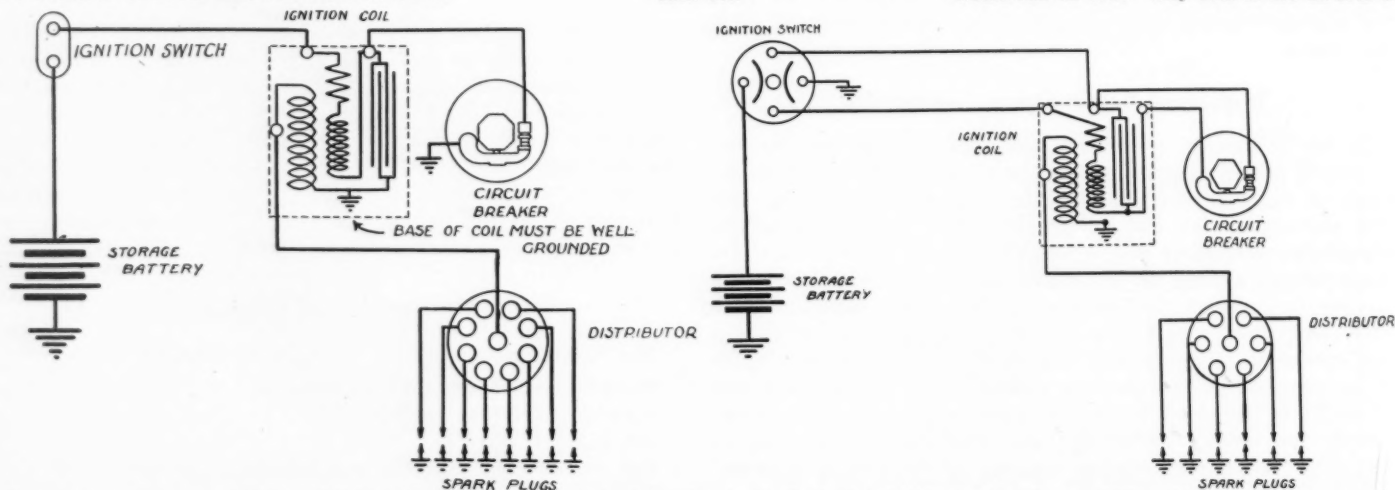


Fig. 2—Wiring diagram of the Remy ignition showing both the insulated, right, and grounded system, left

slow speeds and miss at higher speeds? I have adjusted the carburetor while the car was running at the missing speed and it only affected the two cylinders.—H. A. Scherrer, Dragoon, Arizona.

There is no doubt some defect in the ignition system and the trouble is probably in the contact maker. Wear of the cam and fiber block is often responsible for such missing, which would be noticed especially at high speeds. The reason it misses at high speeds is because the contact points are not separated by the cam surface due to vibration of the interrupter housing. At lower speeds these parts will not shake so much and the action is slow enough to separate the points. The remedy would be to get a new contact breaker and housing or at least renew the parts that are worn.

Wiring Coil and Magneto

Q.—Suppose two cars are to be wired up for ignition. One has a Remy system with separate switch, magneto and battery. The other has a Splitdorf magneto, battery and box coil. All wires have been disconnected from coil, magneto and battery terminals, and in addition the wires are discolored and no symbols are to be seen any place. Using nothing but a test battery, how would you proceed to connect up the systems? By what test can you tell where the secondary is grounded inside the coil? Would the answer to these questions apply to all systems or to any in particular?—M. H., Chicago.

You leave us in the dark somewhat concerning the particular model of magneto or coil, as this makes considerable difference in the way they are connected. We are showing, however, two diagrams, one of the model D Splitdorf magneto with box coil of the non-vibrating type; the other, the Remy ignition system, showing both the grounded and insulated types. From these we think you will get some idea as to the manner of making the connections.

The secondary wiring usually is grounded inside the coil box, a connection being made to a binding post on the outside of the box. From this terminal a wire is run to some part on the engine. This is necessary because the other end of the secondary is connected to the spark plug, the body of which is in contact with the engine, thus offering a path for the high-tension current, broken, of course, at the plug gaps.

We believe by a little experimenting with the different terminals of your apparatus you will get them connected properly, which you can tell by getting a spark at the plugs.

Wiring of Studebaker 15

Q.—Publish diagram of electrical system on Studebaker, model 15, with Wagner lighting and starting, Remy ignition.—C. H. Bowman, Nash, Okla.

A diagram of the electrical system used on this car is shown in Fig. 7.

Carburetion

Webber Carburetor Information

Q.—Publish sketch of the Webber carburetor. I want to put it on a 1913 model Pierce-Arrow. What is name and address of manufacturer of this carburetor?—H. P. Lanning, Los Angeles, Cal.

A side view of the Webber carburetor is shown in Fig. 3. In adjusting the carburetor turn A to the right for a lean mixture and to the left for a rich mixture for idling. Adjust A one notch at a time. For maximum power turn screw B, following same directions as before. Turn this two complete turns at a time. Turn

TO assist readers in obtaining as a unit all information contained in this department on a certain subject in which they may be most interested, such as ignition, carburetion, etc., MOTOR AGE has segregated inquiries into classes of allied nature. Questions pertaining to engines will be answered under that head, and so on.

THE ELECTRIC SYSTEM

G. H. Smith.....Clarksville, Ark.
C. H. Rice.....Tuscaloosa, Ala.
P. F. Stahl.....Meyersville, Tex.
Reader.....Kalamazoo, Mich.
J. Sacks.....Chicago
H. A. Scherrer.....Dragoon, Ariz.
H. Strom.....St. Paul, Minn.
C. H. Bowman.....Chicago
C. H. Bowman.....Nash, Okla.

CARBURETION

H. P. Lanning.....Los Angeles, Cal.
Harry Albrecht.....Massack, Ill.
Fred Vandewark.....Windsor, Col.
John Barron.....Elkton, S. D.
J. Sacks.....Chicago

ENGINES

Robert Chrismer.....Yuma, Col.
C. D. Purington.....McCook, Neb.
B. F. Perry.....Lindenwood, Ill.
J. Werner.....Chicago
Frank R. Brown.....Stevens Point, Wis.
Miss I. J. Parkinson.....Pasadena, Cal.
W. C. Strom.....St. Paul, Minn.
W. C. Copeland.....Rochester, Ill.
C. H. Bowman.....Nash, Okla.
P. F. Stahl.....Meyersville, Tex.

MISCELLANEOUS

Charles E. Nowels.....Longmont, Col.
E. T. Lewis.....Washington, Ohio
S. Richmond.....Norwood, Ohio
H. C. Smith.....Sparta, Tenn.
Subscriber.....Newman, Ill.
D. S. Herbrecht.....Grinnell, Iowa
John Evans.....Los Angeles, Cal.
W. R. Deering.....Port Arthur, Tex.

REBUILDING

H. Strom.....St. Paul, Minn.
Reader.....Kalamazoo, Mich.
G. F. Burrell.....Boonville, Mo.
Subscriber.....Newman, Ill.

No communication without the writer's name and address will be answered in these columns.

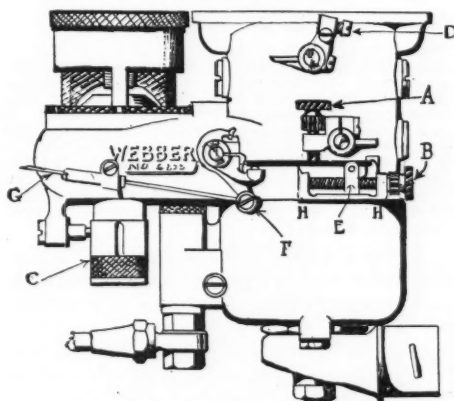


Fig. 3—Side view of Webber automatic carburetor, showing where adjustments are made

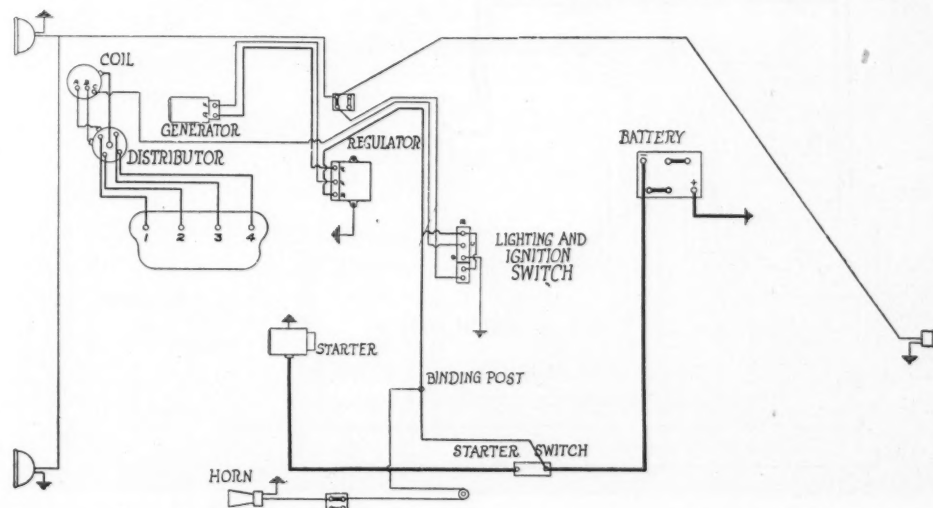


Fig. 4—Wiring diagram of Westinghouse starting and lighting system used on Dort

air valve screw C to the right for more tension and to the left for less. The throttle valve stop screw D should be clamped securely after adjusting. Fulcrum block E should be in the center of its travel from H to H on starting new installation. Starting cam F is operated by either dash or steering control by wire.

This carburetor is made by the Webber Mfg. Co., 66 Stanhope St., Boston, Mass.

Preheating Air on Oldsmobile

Q.—Explain the method of preheating the incoming gases on the Oldsmobile eight, model 45. Could this be attached to the last year's model?—Harry Albrecht, Massack, Ill.

The incoming air on the Oldsmobile is heated by a flexible pipe connected to the exhaust line. The installation is comparatively simple and can be attached to all the late models.

Backfiring in Carburetor

Q.—When there is a flare-back through the carburetor due to a weak mixture, why does not the gasoline in the carburetor bowl ignite?—Fred Vandewark, Windsor, Col.

The gasoline in the bowl is not exposed to the flame. Carburetors are built so that the gasoline from the bowl runs through a small tube to a jet, where at most there would be only a globule of gasoline. On some carburetors there is a small puddle of fuel in the bottom of the mixing chamber, directly under the needle valve, which ignites along with the gas in the manifold sometimes, according to the position of the throttle.

Not Enough Temperature

Q.—I have a four-cylinder Haynes model 20 bought in 1914 and for the last two years I have been troubled with lots of raw gasoline in the oil after a run of 100 miles. When I bought the car it was equipped with model L Schebler carburetor. That fall I had a Rayfield carburetor and a Stewart vacuum feed put on and the carburetor raised by putting on a shorter pipe on the manifold, but I have not had very good results since. Last spring I had the engine overhauled, and the piston rings were all good but one. I put in five patented rings, but the gasoline is in the oil just the same. The compression is good. I am thinking of putting on a new carburetor and attaching it directly to the manifold. What make of carburetor would you suggest, as my present one is leaking and it seems cannot be stopped?—John Barron, Elkton, S. D.

You evidently are running at too low a temperature. The result is that fuel condenses on the walls of the cylinders and runs back into the crankcase. Heat is very essential to properly burn up the heavier particles of fuel, and our suggestion would be that you make sure there is plenty of

first cylinder on either side of the engine, and as a single camshaft is used, with twenty-four cams, if you get the first one set correctly the others will be all right.

Rotate the camshaft until the cams operating the inlet and exhaust valves of No. 1 cylinder are in such a position that both valves are closed. This represents the top of the compression stroke, and the exhaust cam should be in such a position that this valve will be the next one to open. Revolve the engine, and notice if the marks on the gears coincide with this adjustment. If they do not quite do so, set the gears so they will and you will be on the right road.

To set the ignition bring the piston of No. 1 cylinder to top compression with the spark lever about half way on the quadrant. The driving means of the distributor now must be set so the spark takes places at this point in cylinder No. 1.

Oil in Cylinders

Q.—I have a Jeffrey-Chesterfield. How can I overcome too much oil in the six cylinders? I have changed pistons and rings three times but still have trouble.—Miss I. J. Parkinson, Pasadena, Cal.

This trouble sometimes can be overcome by installing six over-size pistons and new rings, fitting these to the cylinders with about 0.002 clearance. By doing this and seeing that the ignition and carburetion are correct, we believe you will not be bothered with oil getting past the rings.

Valves Guides and Cylinders

Q.—I have a model K 1910 Chalmers. I would like to know how to tighten up compression on intake valves, as the valve or valve guides seem to be worn. At present all cylinders but No. 1 pump oil badly. Would over-size rings without reboring cylinder help me any in preventing it?—H. Strom, St. Paul, Minn.

1—On a car as old as this one the best thing to do about the valves is to ream out the guides and fit valves with over-size stems. You may be able to remedy the trouble some simply by fitting over-size rings, but the best thing is to rebore all the cylinders and then lap in the pistons and rings. Of course, this means you will need over-size pistons. Many cases where an excessive amount of oil gets into the combustion chambers have been remedied by fitting special piston rings of the patented types. The makers of such rings usually furnish a special ring designed with an oil-retaining groove which prevents the lubricant from getting into the combustion chamber.

Engine Misses on One Cylinder

Q.—Why will my 32 Hupp miss on one cylinder with the spark advanced after the engine warms up good? It will run smooth with about half a spark. All plugs are good. Connections are good. When it starts missing, if I let it stand for not more than 2 or 3 min., it will not miss until run about a mile or two. It has a Bosch high-tension magneto on it. The spark can be advanced all the way when car is standing and will not miss.

2—Could the valve ports be drilled out $\frac{1}{8}$ or $\frac{1}{4}$ in. without making the waterjacket too thin? How thick is the jacket to begin with?

3—Could the block be lowered $\frac{1}{8}$ in. without doing the engine damage? Would that give it more power?—W. C. Copeland, Rochester, Ill.

1—This sounds as if it might be a choked gasoline line. The gasoline is not supplied rapidly enough to give you good combustion when running fast with the spark advanced, but will run well enough for slower speed and idling. Try cleaning out your tank and gasoline connection between the tank and the engine. Also clean the distributor and see that the magnets of the

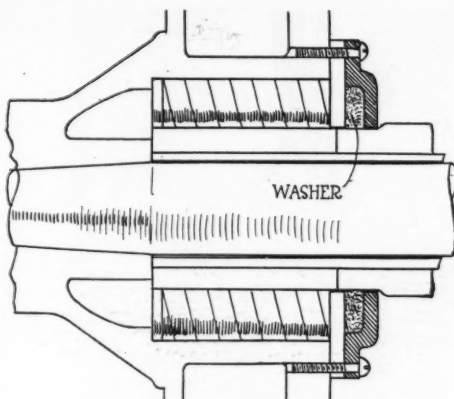


Fig. 8—Felt washers fitted to keep grease from brake drums

magneto have not become weakened.

2—We would not advise drilling out the valve ports on this engine any more than $\frac{1}{8}$ in. The jackets are about $\frac{1}{4}$ in. in thickness.

3—We would not advise increasing the compression of this engine by lowering the block. It will develop sufficient power under its original compression and $\frac{1}{8}$ in. difference would make a tremendous variation.

Bore and Stroke of Studebaker

Q.—What bore and stroke has a Studebaker four 15 model? What width piston ring and how many?—C. H. Bowman, Nash, Okla.

The engine has a bore of 3.5 in. and stroke of 5 in. The piston rings are $\frac{3}{8}$ in. wide and there are three to a piston.

Differences in Types

Q.—What is an L-head engine and a T-head? What kind has the Ford?—P. F. Stahl, Meyersville, Tex.

An L-head engine is one with the valves on one side, like the Ford. The cylinder block and head are arranged thus in an inverted L position. The T-head engine has the intake valves on one side and the ex-

hausts on the opposite. This gives the block a T section.

Miscellaneous

Grease Gets on Brake Drum

Q.—I have a 1916 model Maxwell touring car that gives me a great deal of trouble with the grease or oil running out through the axle housing onto the brake bands, and, of course, the brakes will not hold. I have been advised to use felt washers, but the result is the same. I may not know how to fit the washers. Give remedy for this trouble and show sketch.—Charles E. Nowels, Longmont, Col.

When grease leaks out of the rear axle into the brake drums it is generally a sign that too much lubricant has been placed in the differential. Much lubricant also works down the driveshaft from the universals on some cars, and all this adds to the amount already in the axle. Felt washers will help, and they should be fitted as shown in Fig. 8. A small plate is screwed to the inside of the wheel hub, under which is the washer, the latter being installed by removing the plate. First make sure that the axle tube and differential housing is not too full.

Rear Axle Gear Adjustment

Q.—How can the purring noise in the rear end of a Studebaker six 1916 be overcome?—E. T. Lewis, Washington, Ohio.

This noise probably is caused by wear or misalignment of the bevel pinion and ring gear, which must be adjusted. Remove the cover from the gearcase and you will see a large nut back of the pinion which meshes with the ring gear. This nut adjusts the Timken pinion bearing. A small set screw holds the adjusting nut, which should be loosened and the adjusting nut turned sufficiently until the play in the gears is taken up. Put a small strip of paper between the teeth when remeshing them; this will give the necessary amount of back lash. The adjusting nut can be turned with a drift punch. Do not draw the pinion up too tight. The back wheels

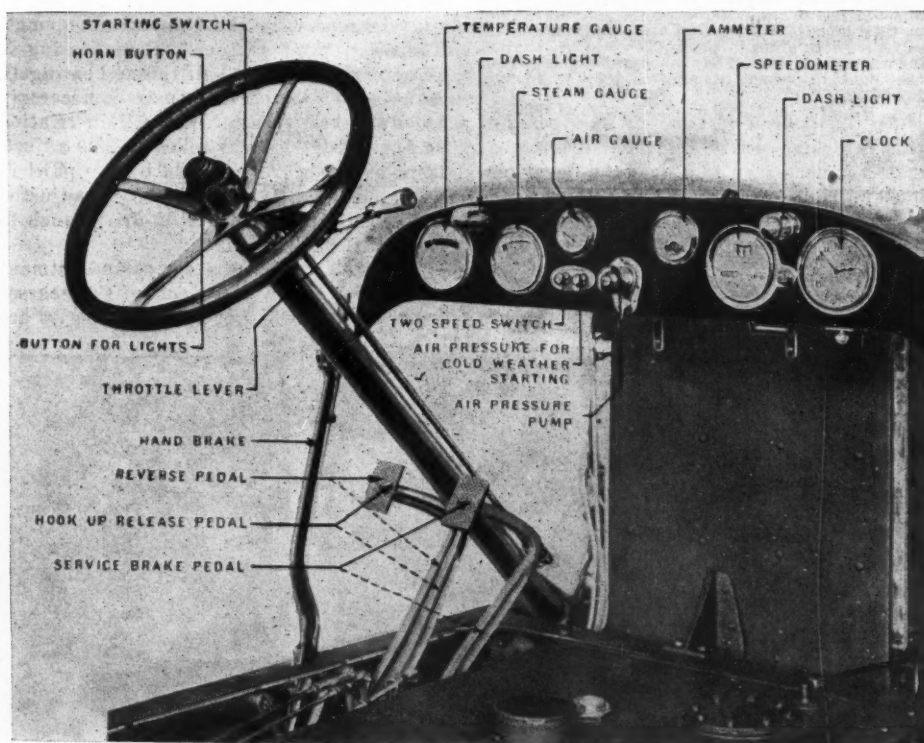


Fig. 9—Layout of instrument board and pedal arrangement on Doble-Detroit steam car

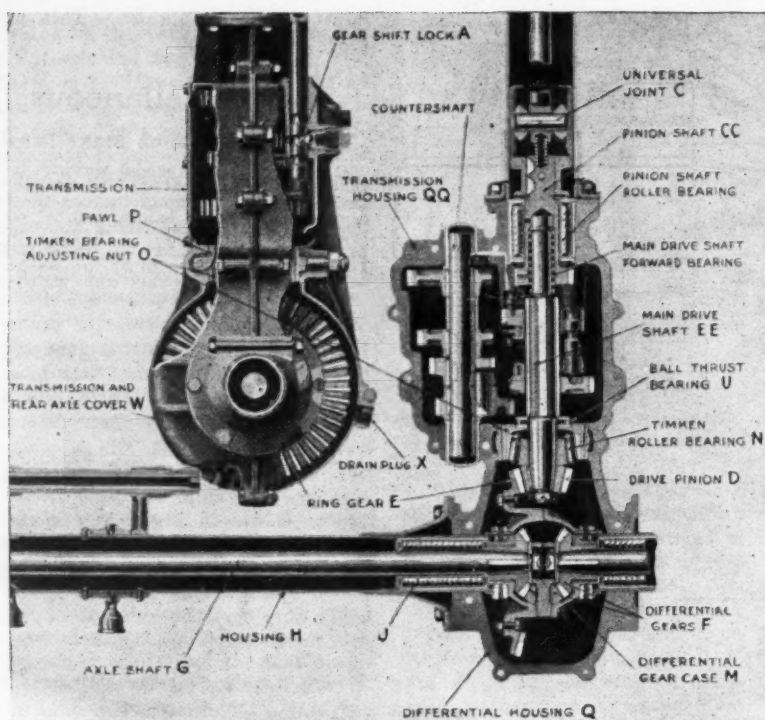


Fig. 10—Sectional view of Studebaker rear axle, showing pinion and ring gear adjustments

should be jacked up from the floor when doing the job, the gearshift lever in neutral, and the rear wheels moved back and forth to try the adjustment as it is made. If the large gear must be moved to get proper adjustments, you will find adjusting nuts on each side of the differential carrier, with a locking device. This must be unloosened and the nut on one side backed off, while the other is turned in the same direction, thus forcing the gear closer to the pinion or away from it as the case may be.

Adjusting Studebaker Axle

Q.—Publish diagram of rear axle and transmission on model 25 Studebaker and advise method of adjusting pinion and ring gear. Also advise where slats in pullrod should be, that is, in what position. They are approximately at the housing when in neutral.—S. Richmond, Norwood, Ohio.

An illustration of the rear axle gears of this car as shown in Fig. 10. When wear makes it necessary to adjust the bevel pinion and ring gear proceed as follows: The wear can be taken up by adjusting the pinion D by the adjusting nut O. Remove the hand-hole cover from the gearset case and the nut O is accessible. Pawl P, which holds the adjusting nut and also the ad-

justing nut of the ball thrust bearing U, is riveted to the hand-hole cover and, therefore, comes off with it; but in addition to this pawl the Timken bearing adjusting nut O also is set by a clamping lock located within the housing at a raised point, just above the bearing.

To get at this bolt a plug at the side of this raised point must be removed. This exposes the nut on the head of the clamping bolt. It can be turned with a socket wrench or strong screwdriver. Loosen the clamp bolt which holds the nut O and turn the latter sufficiently to take up the wear between the pinion and ring gear. It can be turned with a drift punch. Do not be too vigorous with the hammer and punch. The adjustment of the Timken bearing N is reinforced by the ball thrust bearing U. In adjusting the pinion it may be necessary to adjust ball thrust bearing U in relation to N. This is done as follows: The adjustment of the bearing is held by the pawl P, as described. Bearing U can be adjusted by turning it inward with a drift punch to tighten the adjustment.

The way to get the correct adjustment on the shifter rod is to open up the gearset case and note whether or not the gears are

in the proper speeds when the hand lever is in the corresponding slot in the H-plate. Then, if need be, the rod can be adjusted for length to suit.

His Engine Gets Hot

Q.—I have an Overland Country Club model which has been run about 1500 miles. This car has been giving some trouble by getting too hot. When it is run for 25 or 30 miles on a steady drive it gets hot and often boils the water. The valves have been ground, oiling system, fan, valves and carburetor checked up and found O. K. It runs nicely until it gets hot and then it merely loses power. It knocks some when pulling on a hard hill with advanced spark, but when retarded it quits knocking. Would its firing too early cause this heating?—H. C. Smith, Sparta, Tenn.

Overheating may be due to driving with a retarded spark, poor lubrication, too rich a mixture, obstructions in the water system, wrong valve timing or incorrect ignition. A slipping clutch also causes overheating as it allows the engine to run faster than it should at that particular car speed. Are you sure you have drained your anti-freeze solution? Some of these solutions cannot be used when the weather gets warm, as the boiling point is lower than water.

You should be able to overcome your trouble by checking up on the ignition system, making sure that you are not driving with a retarded spark, examining the hose connections, etc., of the water circuit, etc. See that the engine gets good oil and a sufficient amount; set the carburetor as lean as possible; inspect clutch, and finally make sure you get a good spark at the plugs. If there is too much carbon in the engine, it naturally will get hot and boiling in the radiator may result. The remedy, obviously, is to get out the carbon.

Starter Clutch Slips

Q.—How is the overrunning clutch on the model 34 Haynes starter made to hold when it gets to slipping? This particular starter holds good enough when the engine is warm, but will not hold when cold.

2—Explain how to test a coil, also a condenser.—Subscriber, Newman, Ill.

1—To relieve this slipping you probably will have to put a new center in the driving ratchet. To do this the radiator must be removed as well as the cover of the driving gears. Then drive out the tapered pin that holds the driving dog in position, whereupon the driving ratchet can be removed and the new member put in.

2—A simple coil test is as follows: Find both ends of the secondary winding, these being fastened to terminals on the bottom of the coil box, and attach a wire to each end. Then, holding the ends of these wires about 1/2 in. apart, throw on the battery

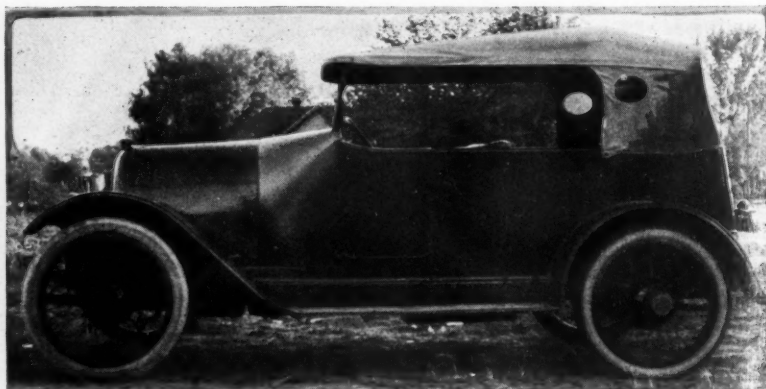
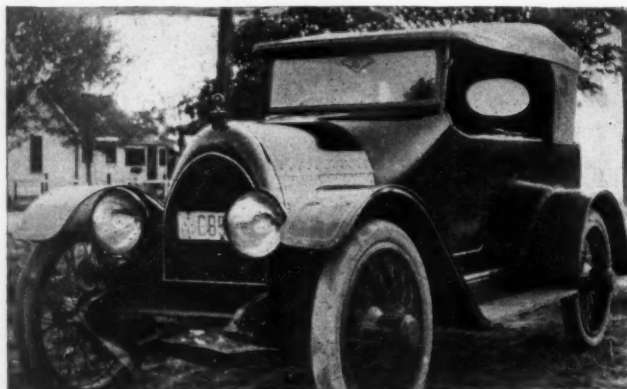


Fig. 11—Four-passenger speedster body built by reader, which might be adapted to model K Chalmers chassis

switch. The engine then should be turned over until the primary circuit is broken. If the coil is in good shape a spark will occur at the $\frac{1}{2}$ in. gap. The length of the spark obtained is an indication of the condition of the coil to some extent, although the magneto, if this is the source of current, may be at fault.

One of the best tests to give a coil is to procure another of the same make in good condition and try it out on the particular car in question. If the same trouble occurs as before, you may be sure the trouble is not in the coil. You must be sure, however, that all wiring, etc., is correct.

There is little use in the average owner trying to determine the nature of a fault in a coil, for unless the trouble is around the terminals, it must be returned to the factory or service station anyway.

A broken-down condenser usually will be indicated by the points becoming sooted very quickly, and the spark instead of being blue will have more or less of a red color.

Cut-Out on Hudson

Q.—Give a diagram for installing a muffler cut-out on a 1918 Hudson Super-Six speedster. Where would be the best place for the pedal? Could it be connected so as to have the pedal on the dash just above and to the right of the brake pedal?—D. S. Herbrecht, Grinnell, Iowa.

A diagram is hardly necessary for this as the job is comparatively simple. Install the pedal where it is most convenient and then all you need do is connect the cut-out with a chain or cable to the pedal, running the chain through pulleys, if necessary, to clear parts that are in the way. Sometimes cut-outs are installed with a pedal made integral and necessitating no cable or chain. They are operated by merely depressing the pedal, usually located so it can be operated by the heel.

Brake Rods Are Worn

Q.—I have an Overland 75, which has been run 12,000 miles. It has developed unusual body looseness and enough wear on gearshift and brake rods to cause a good deal of rattling on rough roads. Would shock absorbers eliminate such rattles or are new parts the only solution? The compression is fairly good and the car pulls well. Under such conditions would a single non-leaking ring on each piston probably be worth while?—John Evans, Los Angeles, Cal.

Wear in brake rod clevises, levers, etc., generally is caused by lack of lubrication. All these small parts must be gone over after the car has been driven a short while and tightened up, after first being supplied with oil or grease. Naturally wear will take place on any car part that moves, especially when exposed to mud and water. Shock absorbers are a great aid in saving wear on bearings and body joints, as they insulate the car from excessive vibration

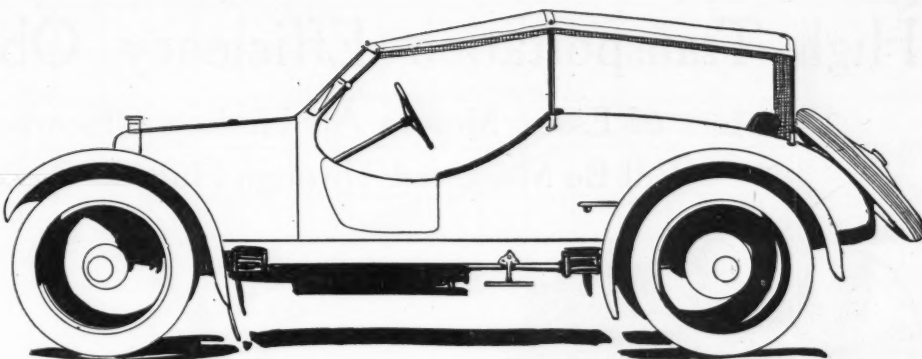


Fig. 13—Suggestion for four-passenger sport body mounted on 1917 Saxon six chassis

and road shocks. If the parts have worn considerably, new ones are the remedy. When you get the new ones make small leather or canvas boots for them, to keep the lubricant in and mud out. Also keep the springs well oiled; this not only makes riding more pleasant but saves the chassis parts from many jolts.

A single ring of the non-leaking variety would be beneficial in a case like this and certainly would do no harm. Many owners have improved their engines by fitting such rings, especially if the engine has a tendency to pump oil in one or more cylinders.

Wants Larger Axle Shafts

Q.—Would it be possible for me to use a 1 $\frac{1}{4}$ -in. or 2-in. axle in the regular Ford differential in the place of the 1 $\frac{1}{4}$ -in. now used? Could I do this by enlarging the roller bearing housing and using the regular worm drive hub and solid tires? I have a passenger truck that seats fourteen men. It is the regular Ford chassis with an extension. I have broken four axles in the last three months, which cost me \$14 for each breakdown. Can I have this done for less than \$75. Where could I have this done?—W. R. Deering, Port Arthur, Tex.

It would not be practical to fit larger axle shafts in the Ford rear axle system, because the housing cannot be increased to accommodate larger bearing sleeves. If you kept the sleeves about the size they are now and then fitted a bearing for a larger shaft the rollers of the bearings would be so small that they would not stand up. It seems to us the only solution for you is to fit one of the Ford converters or get a Ford worm-driven truck chassis. You are running your car over-loaded, which is the reason for the axles breaking.

Rebuilding

Wants Chummy Four Roadster

Q.—Publish an illustration of my model K 1910 Chalmers rebuilt as a chummy roadster. Could I use the old slats and fenders? Would it be possible to put a shield over the present radiator to resemble the National? Could I also raise hood and cowl?—H. Strom, St. Paul, Minn.

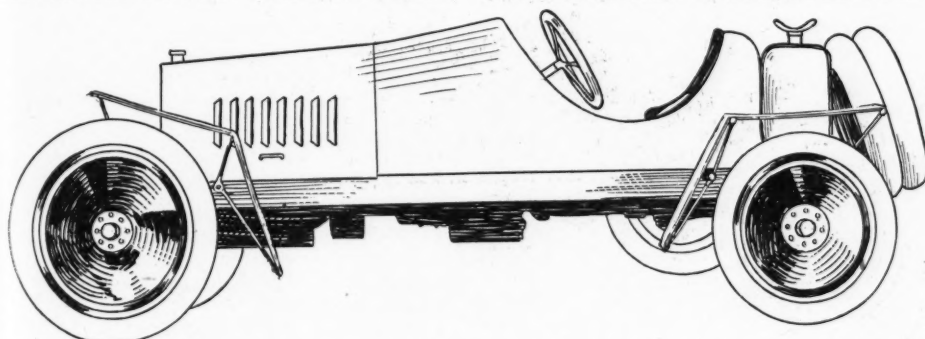


Fig. 12—Saxon four-cylinder roadster converted into a light speedster with body comparatively simple

In Fig. 11 is shown a reconstructed Chalmers with a close-coupled body built by a MOTOR AGE reader. This may give you some idea as to what you might do with your car. The car shown has one door on each side, and as will be noted the radiator is of the Fiat type. A spare wheel is carried in a compartment at the rear.

We believe that you will be able to use your old seats, and it should not be a difficult matter to incorporate in your design the old fenders. You also might put a shield over the radiator to resemble the National, but it will be necessary to get the services of a metal worker. The same is true of the hood and cowl. The latter can be changed considerably, and its design will be influenced greatly by the shape you make the radiator shell.

Wants Saxon-Four Speedster

Q.—I have a 1914 Saxon four in fine mechanical condition which I would like to rebuild into a light speedster. Publish sketch similar to the Hupp 1916, making the necessary changes to fit Saxon frame. I have a new Cornelian radiator, which I would like to use. The hose connections are about $\frac{3}{8}$ in. smaller than the present radiator but will hold more water, so I think the cooling should be about the same. If you have a sketch for a Saxon which would be more simple to build but just as racy, publish instead of 1916 Hupp.—Reader, Kalamazoo, Mich.

In Fig. 12 we show a design of Saxon speedster built on the four-cylinder chassis. This is more or less a conventional type of design, but as it is comparatively simple to build and looks well, it should be adhered to by the average home constructor. At that, it is very likely that the services of a metal worker will be needed, for he is equipped with facilities to work metal, and unless all the curves, etc., on the body are clean cut and graceful the job will not look well if make-shift tools and equipment have been used. You can get the tank made up so there is nothing to do but mount it.

Four-Passenger Saxon Speedster

Q.—I have a 1917 Saxon-Six, which I am building over into a four-passenger sport car. I have had the frame lowered about 4 in. Illustrate a car with wire wheels, low four-passenger body and individual fenders.—G. F. Burrell, Boonville, Mo.

A suggestion for this car converted into a four-passenger speedster is shown in Fig. 13. This illustration is made with the frame lowered 4 in.

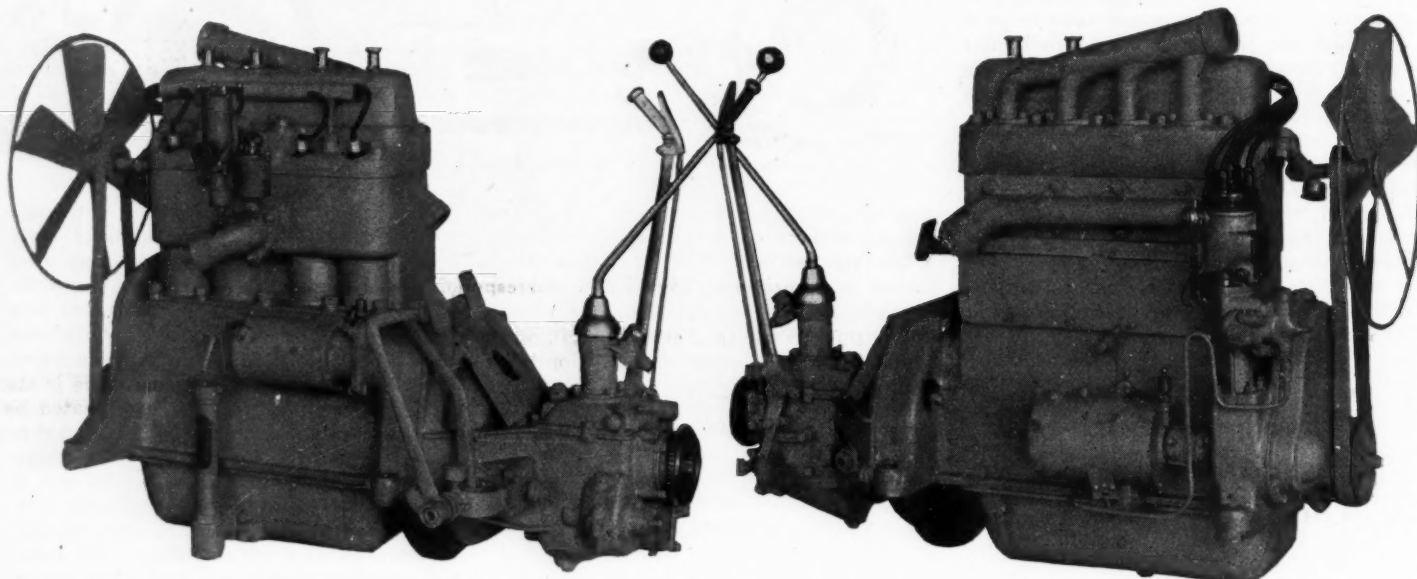
Wants Overland Body

Q.—Where can I purchase a chummy roadster body for model 80, Overland chassis?—Subscriber, Newman, Ill.

Write to some of the builders of special bodies advertised in MOTOR AGE.

High Transportation Efficiency Object of Essex Car

Directors of Essex Motors All Hudson Officers—Distinctive Light Four
Will Be Marketed Through Hudson Dealer Organization



Essex power plant showing four-cylinder unit with intake valves in head and exhaust valves in sides. Carburetor bolted to the cylinder head. Note short overall lengths of unit, engine being 29 in. overall. The right side of the power plant shows mounting of generator and ignition distributor

It has been known for almost two years that a lighter, lower-priced car than the super-six would be furnished Hudson dealers and the organization of the Essex Motors announced in MOTOR AGE last fall was followed with more than usual interest because its directors are also officers of the Hudson Motor Car Co. At that time it was stated that the new concern would have its product on the market during the summer of 1918. Although the Essex is being produced by an organization which is altogether separate from the Hudson company, it is being built in the Hudson factory and will be sold by Hudson distributors and dealers, thus giving it the stamp of an established factory and an established selling organization, based on a design brought out by engineers of Hudson experience.

A five-passenger touring car alone will be made for the present. In the fall a sedan model will be brought out. The body design is unusual in appearance, although beyond the more decided use of the beveled edge which is carried to the front end of the radiator, there is little about it which could be termed radical.

Designed for Low Maintenance

The Essex sells for \$1,395 and incorporates the qualities making for low maintenance and economy. The wheelbase is but 108½ in. although a view of the exterior makes this appear at least 115 in. due to the low-hung body, short hood, long cowl, and general distribution of space.

Its engine is probably the most unique feature of the car. This is of a lightweight high speed type, 3% by 5 in., having four cylinders and developing more than 55 hp. at 2800 r.p.m. This power, with a total car weight of 2580 lb. including filled tank

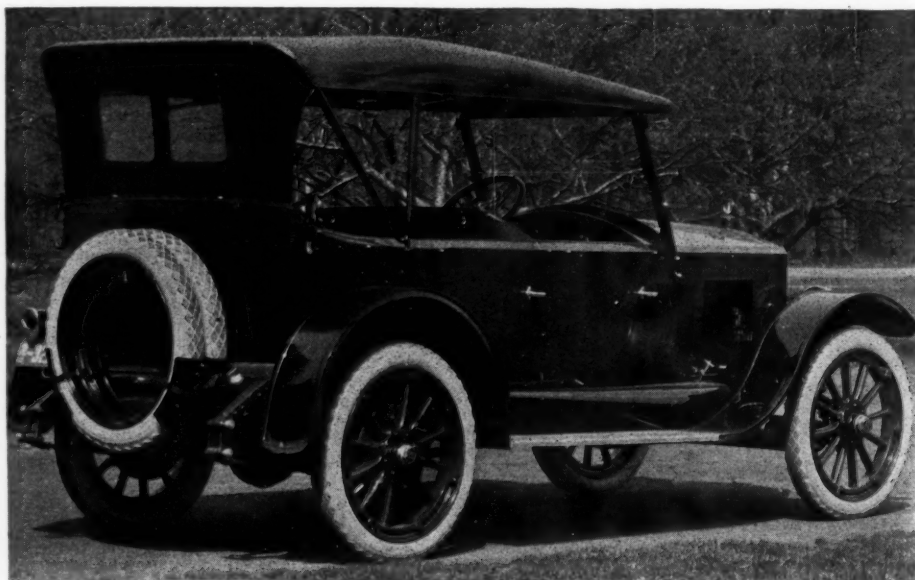
and two extra tires, gives an unusually high power-weight ratio.

A representative of MOTOR AGE drove one of these cars over the roads around Detroit and found the speed range between 4 m.p.h. and 63 m.p.h. on high gear. The car is exceptionally smooth riding, due to its balance and the use of a 54-in. rear spring, one-half the length of the wheelbase. Due to the use of Lynite aluminum alloy pistons and a fully counter-balanced crankshaft, there is no noticeable period of vibration, although this is generally found in the neighborhood of 28 m.p.h. on four-cylinder cars.

In many particulars the engine is unique.

It is peculiarly adapted to a car of this short wheelbase because of its short length. Although developing in excess of 55 hp. it is but 29 in. overall, thereby using but little of the wheelbase length. The intake valves are in the head and the exhaust valves on the side. The top of the cylinder head is removable, the manifold carrying the carburetor being bolted directly to the head.

From the carburetor, the flow of gas is downward into the top of the cylinders, thus distributing the gas evenly into each cylinder. One of the objects of this method is to overcome starting difficulties in winter, as well as to secure even distri-



Showing top up, illustrating high seat back. Note protection of gasoline tank

bution. Another factor in the distribution of the gases is that the cylinder head and manifold passages are internally machined.

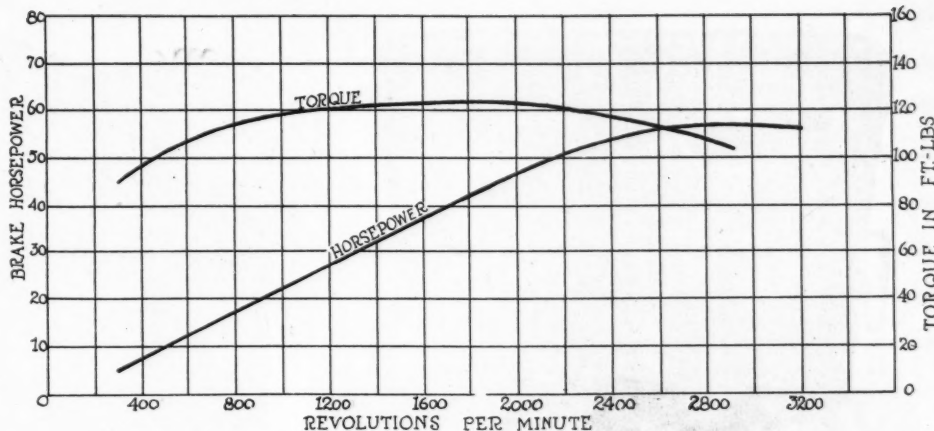
Cylinders are cast in block and the engine proper, therefore, is made up of three main castings, the cylinder block, cylinder head, and the crankcase, which is of aluminum. Below this there is an oilpan of pressed steel which can be dropped and which provides access to the main bearings. Following the characteristics of the latest developments in high-speed engines, this design has been carefully worked out for free intake gas passages.

Machining of the ports which are of large diameter and the placing of the intake valves in the head, those valves being $2\frac{1}{8}$ in. diameter in the clear, permit of high volumetric efficiency and preclude the possibility of wire-drawing up to speeds of 3000 r.p.m. The car is so geared that the motor is turning over at 3000 r.p.m. at a car speed of 60 m.p.h. Inasmuch as the car is capable of more than 60 m.p.h. the speed possibilities of this little powerplant may be appreciated.

To permit high rotative speed, the crankshaft is of large diameter. There are three bearings; the front having a diameter of $2\frac{1}{8}$ in. and a length of $2\frac{1}{4}$ in., the center $2\frac{3}{8}$ by $2\frac{1}{8}$, and the rear $2\frac{1}{8}$ by $2\frac{5}{8}$ in. The valve drive is taken through helical timing gears with the intake and exhaust valves both operated on the same camshaft. The intake valves are operated off a rocker arm, while the exhaust, being on the side, is actuated through straight push rods.

Has Radiator Shutters

Water circulation is by thermo-syphon, the cooling system being to a large degree controllable by the operator through shutters on the radiator. In connection with a Boyce motometer, these shutters permit the driver to maintain water circulation at the temperature desired. Lubrication is by constant level, circulating splash. The reservoir is in the pressed steel oilpan, bolted to the base of the crankcase. This pan is so exposed to the air draft resulting from the motion of the car that the oil is kept cool. The oil pump is connected



Horsepower tests of first Essex engine made after 3500 miles of road work. Note flat torque curve. Horsepower curve peaks at 2900 r.p.m. Maximum torque at 1800 r.p.m. corresponding to a car speed of 35 m.p.h.

with the throttle so that the length of the stroke of the oil pump is in relation to the throttle opening, thus governing the supply of oil which is fed to the main bearings. From this point the oil overflows into splash troughs in the usual manner and the bearing surfaces are lubricated by the spray from the connecting rod.

Gasoline is supplied through the Stewart vacuum system, the gasoline tank being in the rear, having 13 gal. capacity and protected by being within the frame extension. The tank carries an automatic gauge indicating the quantity of fuel in the tank. The carburetor is made particularly for the Essex car, being a product of the engineers who designed the car and is a piston type in which a piston is raised by the suction of the engine lifting in its turn, the metering pin which governs the gasoline feed thus controlling the mixture. For starting there is a strangling device which provides the necessary rich mixture.

Lighting, starting, and ignition is Delco. Lighting and starting is by the two-unit systems. The generator drive is taken off the same gear which operates the Delco timer-distributor unit. The starting motor is mounted on a flange on the left side of the crankcase engaging with the flywheel by means of a screw gear. The electric

lamp equipment includes parabolic head lamps with the dimming attachment, instrument light, tail light, and there is also an electric motor driven horn located beneath the hood. The electrical switches are equipped with security lock and keys. The plugs are in the head just to the side of the intake valve.

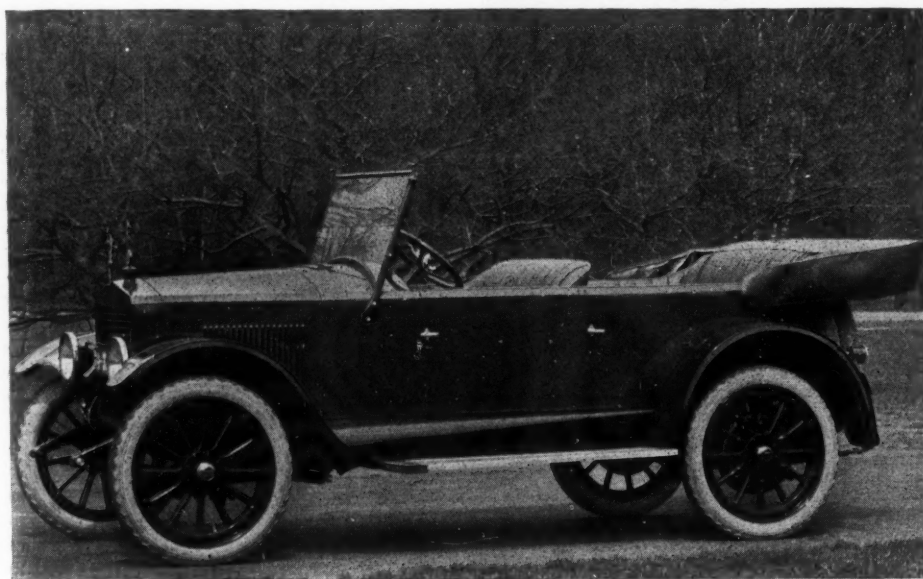
The disk clutch has cork inserts giving a soft engagement. The gearbox is a standard three-speed type mounted on roller bearings throughout, provided with a lock to hold the gears in neutral position. The rear incorporates Hotchkiss drive with semi-elliptic springs mounted or shackled at the rear on continuations of the frame unit. The rear axle is a floating type with a reinforced pressed steel housing in which the driving gears and differentials are mounted on a separate carrier bolted to the housing. This carrier, together with the assembled gears, can be removed without taking the axle from the car. The driving gears are helical type. The ratio in the rear axle is 4.75 to 1.

Brakes Are Large

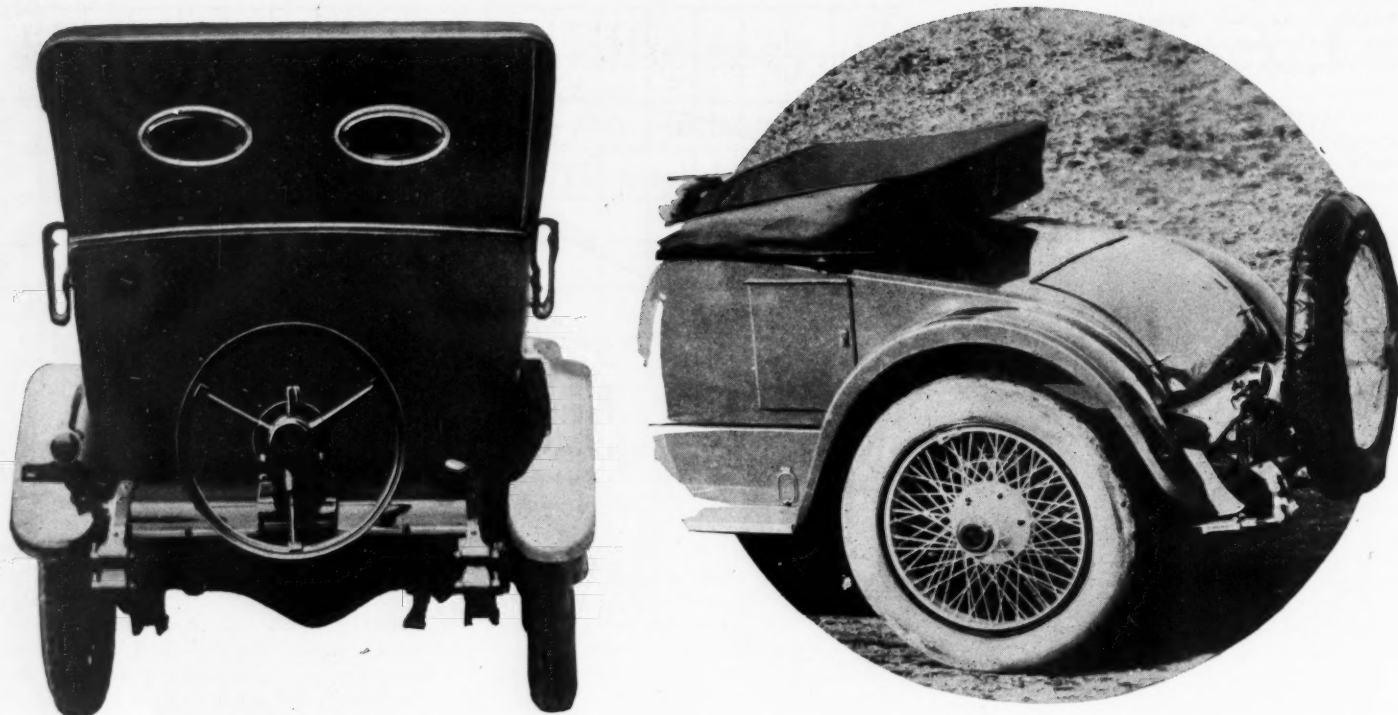
An unusual feature is the size of the brakes. The brake bands are 14 in. in diameter and $1\frac{1}{4}$ in. wide. These are on the rear wheels which carry 32 by 4 in. tires. The spring suspension covers an unusual proportion of the wheelbase, the front spring being 36 in. in length and the rear 54 in. Both springs are 2 in. wide.

On account of the short engine and the use of the unit powerplant, together with an absence of lost space between the radiator and engine at the front end, it has been possible to put an unusually roomy five-passenger body on this car. The driver's compartment can be entered or left without difficulty and the operating levers are within easy reach. In appearance, the body is distinctive owing to the beveled edge running from the front end to the rear. This gives a noticeably straight effect.

In shape, the radiator is distinctive being a straight angle on top instead of a curve, and the slanting windshield set well back on the cowl presents an attractive appearance. The seats have high backs reaching the passenger's shoulders on men of average height. Cushions are deep and set low so that at no times are the knees of the driver above the edge of the car.



Essex five-passenger car showing novel use of beveled edge



Rear and side views of Cole Aero eight, demonstrating patented tire carrier at the rear of the car

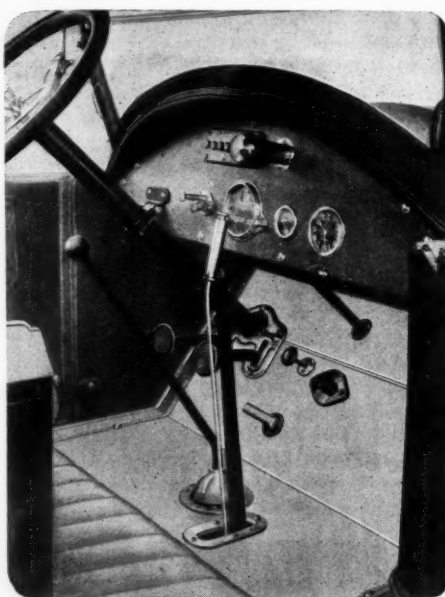
Cole Aero Features

ONE of the distinctive features of the Cole Aero eight is the patented tire carrier at the rear. A well-designed bracket forms the base of this carrier and is fastened to a special sheet steel cross-member at the rear of the frame, rigidly and securely. When an extra rim and spare tire are to be carried, a three-pronged spider is adjusted to the bracket with a locking device that operates with the same key that is used to operate the ignition switch. When an extra wire wheel is to be carried a false hub is added to the bracket and this also locks with the ignition switch key. The combination wheel and tire carrier is as nearly thief-proof as a device of this kind can be, it is claimed.

Another feature is the long brake and control levers. These are so designed and located that they can be reached without stooping over. A foot rest makes it easier to operate the accelerator, and the dash equipment is within easy reach of the driver. Besides the necessary switches, gauges and speedometer, a combination dash and service light is provided. This last device not only can be used to illuminate the driver's compartment, but it has attached to it 15 ft. of flexible wire that rewinds automatically and can be stopped at any point in its course, thus making available a service light for use at any point on the car where it is necessary. The pedals are adjustable and can be made to fit the requirements of any individual who is driving.

Three-in-One

THE convertible aluminum motor car body produced by the Carrm Tri-Standard Body Co., New York, is three bodies in one. The car can be made a six-passenger landaulet, a three-passenger coupe or a two-passenger runabout at will. The complete body top slides from front to rear to make the change from coupe to



Driver's compartment in Cole Aero eight, showing the long brake and control levers, foot rest for accelerator and other features

landaulet. The after deck here is turned backward on trunnions, the exposed part becoming vertical with its upper edge flush with the back of the top. The coupe door then becomes the entrance to the driver's seat and the rear door, unused in the coupe, becomes available for the landaulet.

When the car is changed to a runabout the forward part of the roof and sides fold inward and the entire top turns forward on a rear hinge and lies within the car body, making a close fit with the back of the forward seat. The back of the body thus forms the deck and completely closes the rear compartment.

The body is made for any chassis and in several other types as well as this.

The Edstrom Rim

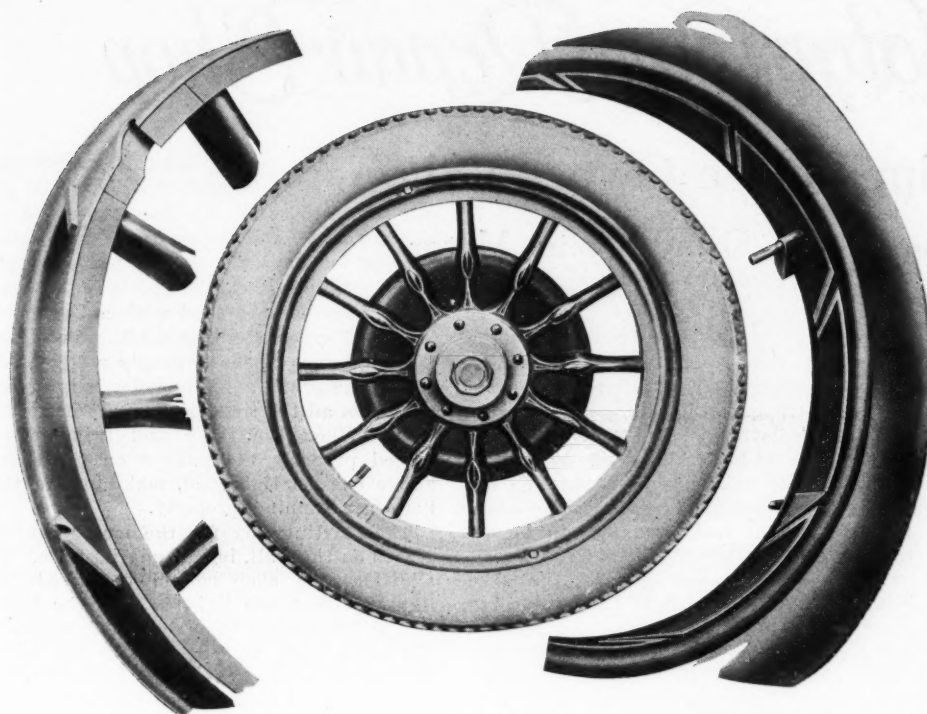
THE Edstrom rim recently introduced to the trade by the Edstrom Rapid Demountable Rim Co., San Francisco, Cal., eliminates bolts, lugs, nuts, etc., and can be removed and replaced in 12 sec., it is claimed. The nature of its construction makes this possible. Instead of the usual lugs, this rim is provided with an interlocking device between the felloe band and rim, so that only a slight pull on the rim will remove it after the two screws acting as a lock are loosened. It is not necessary to remove the screws altogether.

The illustration shows the lugs placed at an angle around the felloe band. Two of these lugs placed at diametrically opposite points are made with a circular depression for the two locking screws. The latter are in the form of tapering screws, which, together with the shape of the recess in the lugs, causes the rim to be held firmly by a few turns with a wrench.

The rim carries at equal intervals around its circumference a set of two lugs, with intervening space to fit the lugs on the felloe band. The lugs are carbon steel, riveted in place under pressure while hot and then put under cold air for hardening. The entering edge of the lugs on the band and those of the rim are rounded off, so the latter slips readily in place.

A feature is the provision made to protect the tire valve stem. It is pointed out that in many conventional installations the stem often is ruined when the tire is taken off. This has been guarded against by building a sort of housing for the stem which fits into a recess cut into the other member. This makes it possible to remove or replace a rim at night without any light, as it can only be applied in one way and the operator merely turns the rim until he feels it slide into place. The screws then are given a few turns and the job is done.

Inasmuch as there are but two screws and these in an inconspicuous place, the



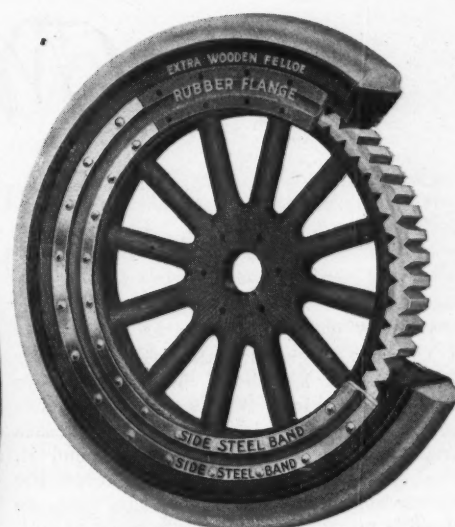
Edstrom rim, showing it attached and separate from the rest

rim looks neat when in place. It further is pointed out that when in place there is no chance for water to find its way between the rim and felloe. Twelve seconds is the time usually specified for a change, but this, it is said, has been done in less time.

Sewell Cushion Wheel

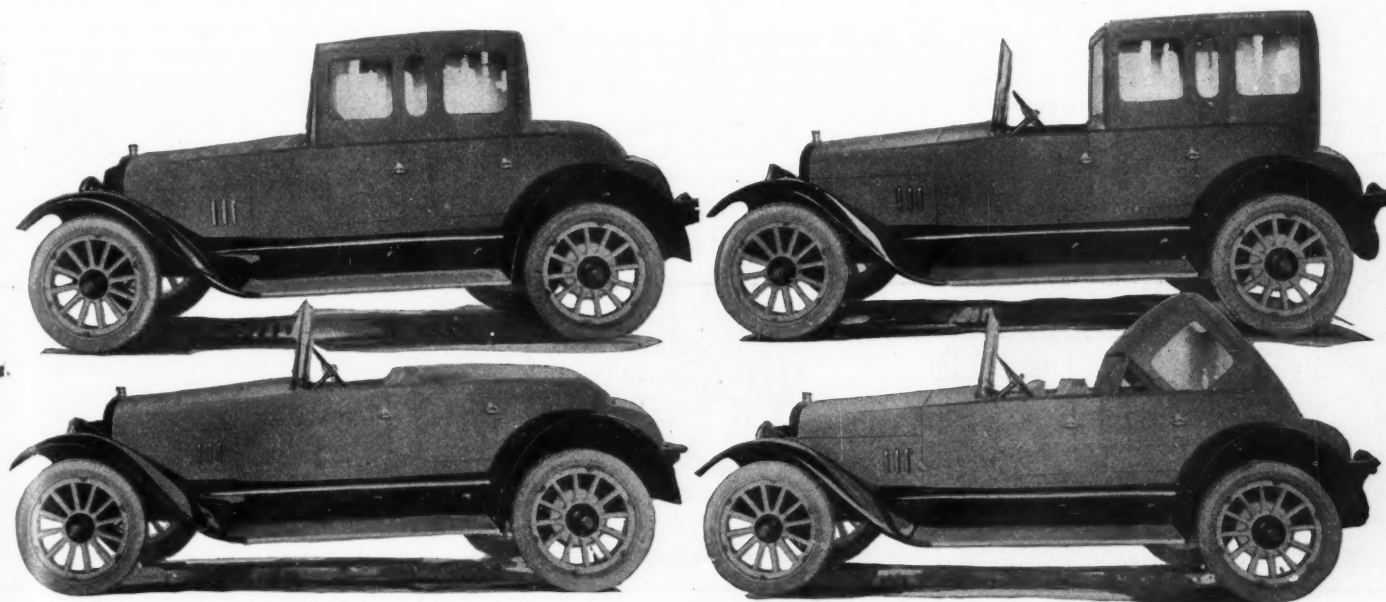
IN addition to live rubber cushions between the outer and inner wheels, the Sewell cushion wheel, product of the Sewell Cushion Wheel Co., Detroit, is fitted with rubber flanges which act as seals, inclosing the rubber cushions in a water- and air-tight housing. This housing also is light-proof and acts as a flexible driving connection between the inner wheels and outer felloes. Since the rubber cushions

are not subject to any abrasive action due to road contact and act only as cushions and nothing more, they can be of a quality best suited for this purpose and not a compromise between resiliency and toughness. The weight of the load is distributed over 40 per cent of the rubber cushions, which are 94 per cent pure Para. With the rubber flanges bolted to both the inner and outer wheels, or inner and outer felloes, and the cushions placed between the felloe bands, there is no connection between wood and wood, steel and steel, or wood and steel, except through rubber. There are two steel bands on each side of the wheel, the outer bands being bolted through the outer rim, and the inner bands through the felloe of the inner wheel. The side steel bands extend over the rubber flanges and cushion from



Construction of Sewell cushion wheel

above and below and are bolted to the felloes to prevent side motion and to keep the wheel true. In starting and stopping much of the shock of the driving mechanism is absorbed by the rubber flanges and cushions as, due to the flexibility of the rubber cushion and side rubber flanges, a slight relative movement is possible. It is claimed that the rubber cushions will be in as good condition after the end of eight or ten years' service as they were originally, due protection from the elements, grease, dirt, etc.



How the Carren motor car body is manipulated to make it provide three body styles in the one

The Motor Car Repair Shop

Equipping the Owner's Shop

The Lathe, Grinder and Motor

BELOW we give an idea as to how the owner might install grinder, motor and lathe in his shop. While there are other installations that would be just as good, this one lends itself to most cases and has several things to recommend it. For one thing all the units except the countershaft are placed on the floor, so there is no weight on the side walls or ceiling except that of the line shaft and countershaft.

The lathe can be what is commonly called a speed lathe, which is not equipped to do screw cutting. This is a simple form of metal turning lathe and is single-gear. That is, the number of changes in the spindle speed depend on the number of steps in the cone for the belt. These lathes can be equipped with a slide rest for light turning work. This rest can be clamped in any position on the bed and is provided with a hand-feed. Inasmuch as the slides are mounted on a graduated base, they can be set at any desired angle for taper turning. If the owner cares to go to more expense, he can fit a screw-cutting lathe, which has automatic feed.

The grinder and motor shown are mounted on a cement foundation, the holding-down bolts being placed in the cement before the latter sets. If cement is not used for the foundations, the latter can be made of

planks and perhaps both motor and grinder placed on one. The latter could be in the shape of a bench, rigidly braced.

Before making the installation it would be well to get the line shafting in place. The latter is supported from the beams overhead by hangers, bolted in place. All of this equipment can be obtained from machinery houses. The countershaft for the lathe usually can be obtained from the lathe maker, so the steps on the cone are the same as on the lathe head. After you get the line shaft in place, with the pulleys slipped on loosely, you can mount the countershaft. Get the shafts parallel by means of sticks or cord, and when you place the lathe, grinder, etc., make sure they are parallel with the line shaft. You can determine this also by dropping a plumb line from the lineshafting and measuring horizontally to it with a straight edge from the lathe bed.

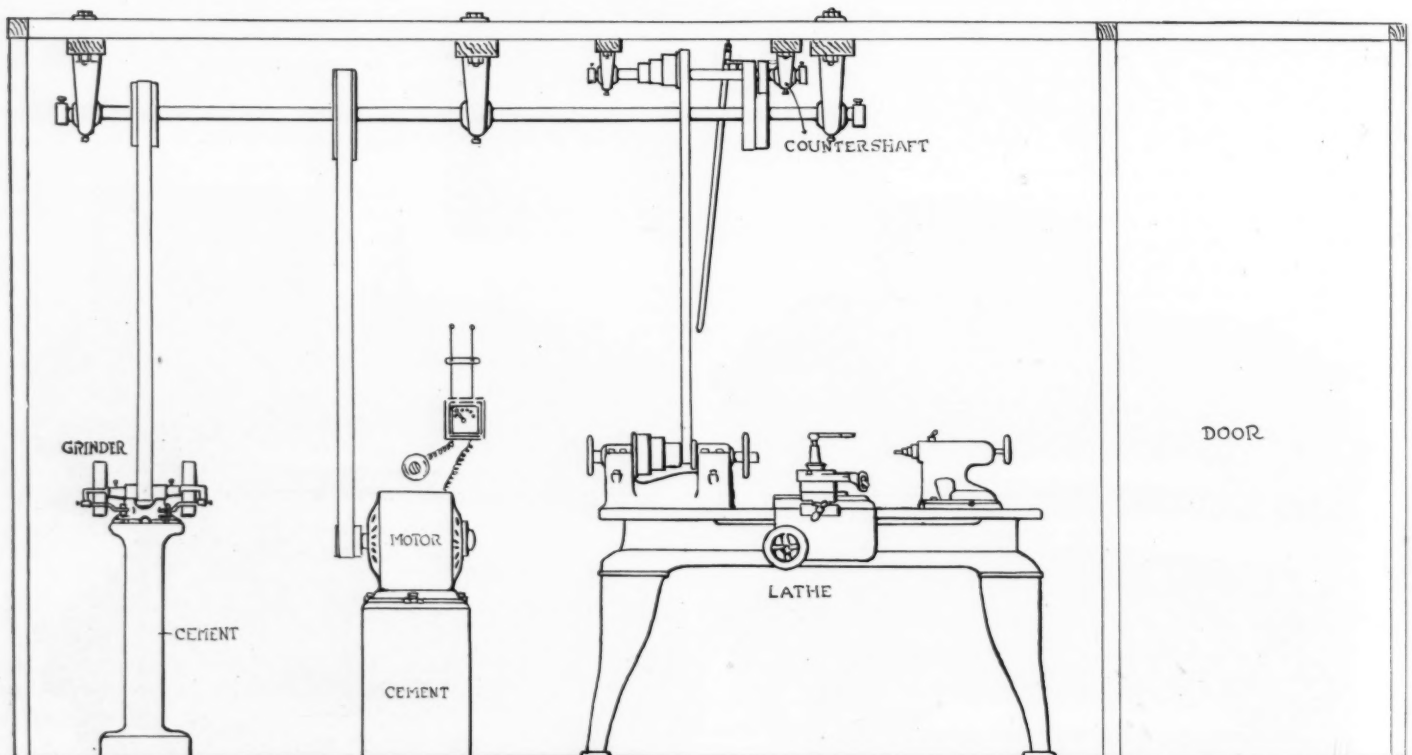
Power for the Shop

The electric motor should be of about 2 hp., operating from the city mains, or if electric power is not available a small gasoline engine can be installed in the same position, running the exhaust out through the side of the building. The electric motor is preferable, as it is handier. The lathe is thrown into operation by a wooden lever placed on the countershaft, while the

grinder can be provided with a tight and loose pulley on the line shaft. The illustration, however, shows simply a tight pulley on the shaft, as the grinder is intended to be run all the time the lathe is in operation. When the lathe and grinder are placed properly the pulleys on the shaft above can be tightened, making sure the belts are running properly.

The starting box for the motor can be placed on the wall, in a handy position. In addition, the shop should be wired for lights so that one light is over the lathe bed and the other the grinder. Sometimes the same light that illuminates the lathe bed can be used for the grinder, by having the light fixed with a cord long enough to reach. In addition to the fittings shown, shelves should be made to hold the lathe tools, etc., on the wall.

The only device left to install is the anvil, which as before mentioned can be of the cast-iron variety with steel top. The anvil by all means should have a good foundation, and, as in the grinder and motor, a cement block makes a fine arrangement. A wood foundation is also good, and a section of a hardwood tree will answer for this. In addition to this anvil a light bench anvil will be found very useful for small work. If desired the owner can buy a vise with which is a small anvil.



How the lathe, grinder and motor can be installed in the owner's shop. If possible, the grinder and lathe should be mounted on cement foundations, or in the absence of these, on a bench made of 2-in. planks. Lathe, motor and grinder must be parallel with the line shaft

The Accessory Corner

Air-Drying Enamel

NORWESCO Utility Black is an air-drying enamel for retouching all the metal parts of a motor car. It also can be used on the engine. The enamel will dry hard and glossy in about an hour, it is claimed, and is the result of several months of testing and experimenting. The liquid comes in two sizes, pints and half-pints. Prices, \$1 and 60 cents respectively.—Northwestern Chemical Co., Marietta, Ohio.

Cooper Muffler Cut-out

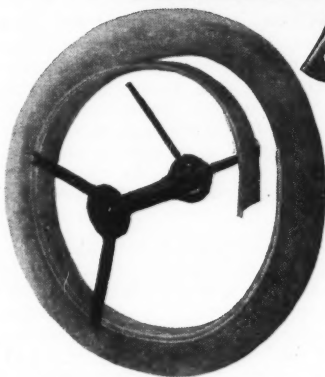
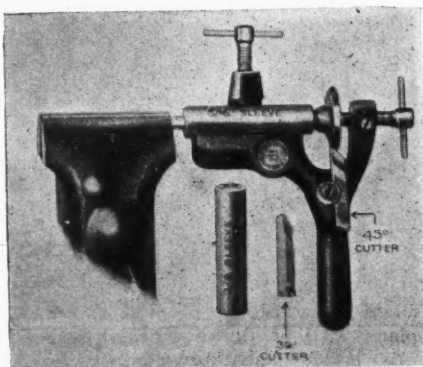
The Cooper special muffler cut-out is so designed that when it is not in operation no exhaust gas can escape except through muffler. Each half of the valve is ground to a gas-tight fit, and the pipe openings are reamed to the diameter of the exhaust pipe. These two conditions, a tight fit around the exhaust pipe and the two halves coming together, prevent the escape of gas at these joints. The flapper valve seat is machined flat and smooth and is made an exact fit with the surface of the flapper valve. A strong flexible tension spring holds the flapper valve to its seat. Each valve is assembled, tested and inspected individually, insuring a uniform product.—Cooper Mfg. Co., Marshalltown, Iowa.

Eleven-in-One Tool

The Ronson wrench consists of one $\frac{1}{4}$ -in. wrench; one $\frac{5}{16}$ -in. wrench; one $\frac{3}{8}$ -in. wrench; one $\frac{7}{16}$ -in. wrench; one $\frac{1}{2}$ -in. wrench; one $\frac{11}{16}$ -in. wrench; one $\frac{13}{16}$ -in. wrench; alligator jaw; bottle opener; screwdriver; and Prest-O-Lite key. While one wrench is in operation the others form a firm, gripping handle. The device is made of drawn tempered steel and nicked. It is small enough to be carried in the pocket, combining in a tool 6 in. long and $\frac{1}{2}$ in. thick, and weighs 8 oz. Art Metal Works, Newark, N. Y.

Quinn Valve Facer

The width of the valve face is no greater after using the Quinn valve facer than before, it is claimed, and the maker does not recommend the use of a re-seating tool with the facer. The device is for universal use. It has $\frac{3}{8}$ and $\frac{7}{16}$ -in. sleeves, though other sizes for over-size stems can be furnished or a machinist can make them. A 45-deg. angle cutter is part of the



Quinn valve-facing tool, top; Cooper special muffler cut-out, center; and Million combination rim tool and jack

regular equipment. In addition 30-deg. or 45-deg. cutters can be furnished. Price, \$5.—G. E. Mullarky Co., Decatur, Ill.

Featherride Shock Absorbers

The Featherride shock absorber consists of two small malleable iron jackets, a heavy steel coil spring and two bolts.

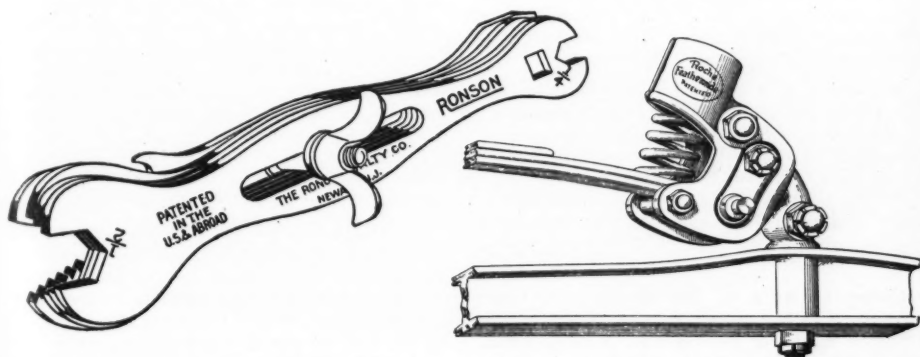
It fits over the front or rear shackles and nothing on the car is removed or disturbed to attach it. Installation requires about 20 min. It is only necessary to clamp over the spring shackles and tighten two bolts, it is said. The device is designed to prevent sideways, absorb rebound, prevent spring breakage, absorb excessive downstroke and cure other defects that shock absorbers can overcome. Price, \$7.50 a set of four.—Roche Electric Mfg. Co., 215-17 North Division avenue, Grand Rapids, Mich.

Million Rim Tool

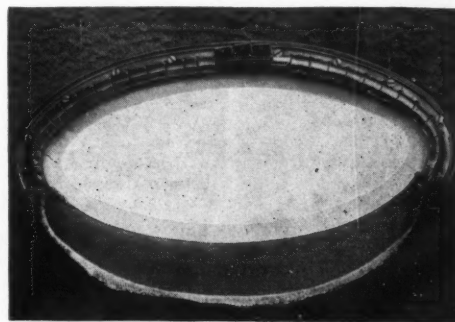
The Million rim tool is a combination rim tool and emergency jack. It is so designed that it will enable the operator to remove or replace all makes and sizes of split rims without the use of other tools or attachments. It can be folded up to go in the tool kit or to be used as an emergency jack. It is a handy device either for contracting the rim when removing a tire or for expanding and truing the rim should it be out of round. Two of the hooks on the tool are stationary, and the third is attached to a screw which has a No. 6 square thread and a diameter of $\frac{3}{4}$ in., giving plenty of power for the most stubborn of rims. Price, \$2.50.—Million Motor Co., Adrian, Mich.

Plate Glass Windows

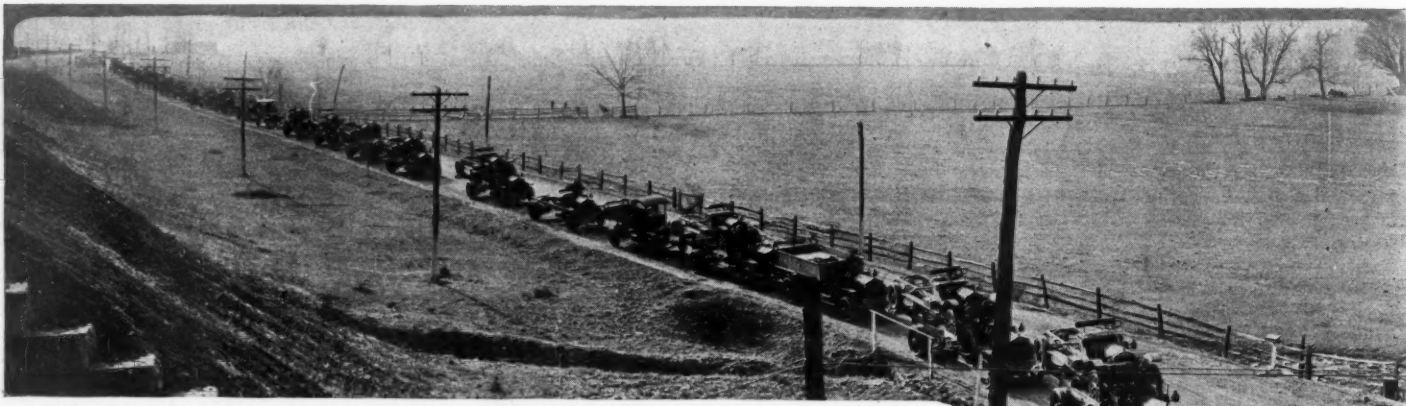
The Avrigid plate glass windows for motor car curtains employ a spring steel gripping ring with resilient fingers which hold the curtain securely and at the same time provide a cushion against which the plate glass is held firmly but without possibility of breakage. The construction of this retaining ring permits the tightening of the glass against the gripping ring by screws. Through the device a plate glass window flush with the curtain is obtained, the whole being leak-proof, it is claimed. The Avrigid may be installed in single or double curtains with or without a retaining ring and in conjunction with a wooden frame. The retaining rings are of non-warping construction and consist of two members glued together and reinforced by the steel gripping ring, which is Park-erized against rust.—Ever Rigid Auto Window Mfg. Co., 1017 South Figueroa street, Los Angeles, Cal.



Ronson eleven-in-one wrench, left; Featherride shock absorber, center; and view showing how the gripping ring in the Avrigid window holds the curtain edge



Among the Makers and Dealers



WHITE MAKES HUGE DRIVEAWAY OF TRUCKS—Forty-nine White trucks, valued at more than \$300,000, were driven over the Lincoln highway from the White factory at Cleveland, Ohio, to Philadelphia, Pa., a distance of more than 463 miles

WILSON Promoted by Packard—J. D. Wilson has been appointed chief engineer of the carriage division of the Packard Motor Car Co., succeeding G. H. Bridie, recently transferred to the aircraft engineering staff. He was formerly assistant carriage chassis engineer.

Schlecht Heads St. Louis Dealers—The St. Louis Automobile Manufacturers' & Dealers' Association has re-elected as president Joseph A. Schlecht of the Mound City Buggy & Auto Co. The other officers follow: Vice-President, P. H. Brockman, DeLuxe Automobile Co.; treasurer, H. L. Schnure, Velie Automobile Co.

Pike to Manage Paige Truck Sales—Charles S. Pike, formerly sales promotion manager of the Paige-Detroit Motor Car Co., has been appointed truck sales manager of that company. He was succeeded in Washington, D. C., as Paige representative by Frank Ceulk, formerly of the Aluminum Castings Co., Detroit.

Meiklejohn to Distribute Wisconsin Fordsons—T. W. Meiklejohn, general manager of the Service Motor Co., Fond du Lac, Wis., has been selected as Wisconsin distributor of the Fordson tractor under the same plant now in effect in Michigan and several other states. The first supply of tractors already has arrived.

Port Huron War Plant Destroyed—The entire plant of the American Machine Corp., Port Huron, Mich., has been destroyed by fire as the result of an explosion. The loss is estimated at \$200,000. Detroit and Canadian capital is interested in the company, which purchased the plant from the American Machinery Co. several weeks ago. The plant probably will be rebuilt.

Employees' Club for Harroun Men—The Harroun Motors Corp. has completed plans for the establishment of a men's club house in one wing of the former Prouty & Glass Carriage plant and is opening this attachment to its welfare work with sleeping quarters for 100 men. This will be increased during the next thirty days to 300. A large dormitory with iron beds, shower and sanitary accommodations, as well as a kitchen and dining room, are being installed.

Tillotson Production Increases Rapidly—During 1917 the Tillotson Mfg. Co. manufactured 175,000 carburetors as compared with 50,000 for 1916, an increase of 28½ per cent. In the three years ending in 1917, 350,000 car-

bureters were built and shipped. The present plant now employs about 300. The company is just getting into production on war work and will soon be employing 400 or 500 men.

Globe Machine to Build—The Globe Machine & Stamping Co., Cleveland, Ohio, will erect a four-story manufacturing and storage building 312 by 92 ft., at a cost of \$125,000.

Harley-Davidson Will Concentrate—The Harley-Davidson Motor Co., Milwaukee, Wis., which in the past has made several commercial models, including a 600-lb. side van and a 400-lb. three-tracker truck, has decided to concentrate in the future on a 400-lb. side van. The motorcycle part will be identical with the Harley-Davidson solo motorcycle except that the engine compression will be a little lower.

Marwin Truck Purchases Plant—The Marwin Motor Truck Co., which recently was organized under the laws of Delaware with a capital stock of \$1,000,000 to manufacture motor trucks and tractors, has purchased the former plant of the Skidd Mfg. Co. at Kenosha, Wis., and will make that city its manufacturing headquarters. The former Skidd group is being retooled and made ready for production.

Los Angeles Branch Plant in Operation—The new Los Angeles assembling plant of the Republic Motor Truck Co., Alma, Mich., is now in full operation, and before many months the company expects to be assembling a minimum of 250 trucks per month. The building has a working floor space of approximately 6 acres. In addition to this there is a well-equipped dry kiln and paint shop, a four-boilered powerplant and an office building. J. D. Poyer, who has been the Republic distributor at Los Angeles, will be general manager in charge of the plant.

Die Firm to Have New Factory—A new factory is being erected for the Toledo Tap & Die Co., Toledo, Ohio. The building will be 200 by 50 ft., one-story, costing \$20,000. Machine tools, taps and dies will be made. The factory will be ready to begin operations about July 1. The company was organized six months ago by Robert E. Ellery to use a new patented thread-cutting device.

Large Foundry to Be Erected—A large foundry will be added to the plant of the Bunting Brass & Bronze Co., Toledo, Ohio. The building will be 175 by 120 ft., two stories high and cost \$150,000 without equipment. The foundry will be rushed to completion

within sixty days. It will have a capacity of 40,000 to 50,000 lb. of bearing brass a day. Forty large brass melting furnaces will be installed. The company has received contracts for bearings and bronze and brass machinery parts for the Government. Bearings for airplanes, submarines and destroyers, large vessels, tanks and gun mountings are manufactured.

Bulck Has Given 4000 to Service—More than 4000 Buick employees are now in Government service, according to latest reports, and employees of the company are still leaving for training centers daily.

Case Tractor Adds to Plant—The J. I. Case T. M. Co., Racine, Wis., has awarded contracts for the erection of another large addition to its works at Racine, which were erected only a few years ago. The addition will be 144 by 513 ft., of brick and steel, and will be used largely to accommodate the overflow of domestic and foreign orders for Case tractors.

Sterling Trucks Train Soldiers—Capt. Alexander Brunson and a company of seventy-eight men have arrived in Milwaukee, Wis., from Camp Sevier, Greenville, S. C., for two weeks' instruction in the assembling and maintenance of Liberty trucks at the plant of the Sterling Motor Truck Co., Milwaukee. It is expected that the company will return to its base in a large convoy of trucks for the quartermaster's department at Camp Sevier. Capt. James A. Bell and a squad of twenty-three men from Camp Grant, Ill., have completed the course of training and left with a convoy of ten trucks.

Western Overland Companies Combine—Two subsidiary companies of the Willys-Overland on the Pacific coast have been consolidated, the Willys-Overland Co. of California and Overland Pacific, Inc., under the name Willys-Overland Pacific Co. Frank Riggs is vice-president and general manager. He was manager of the Packard truck de-

partment in Detroit prior to becoming Packard dealer at Portland, Ore., from which position he left to become associated with the Overland company. The new company will serve California, Oregon and Washington, and parts of Montana, Idaho, Nevada and Arizona.

Nelson to Ship New Models—The A. E. Nelson Co. expects to start its first shipment of new cars in a few days. The chassis are all ready, and immediately upon the arrival of the bodies which are ordered and expected any day the cars will be ready to go out.

Monarch Tractor to Expand—The Monarch Tractor Co., Watertown, Wis., has awarded contracts for the erection of a brick and steel addition, 140 by 160 ft., to its machine and assembling shop, and when this work is completed it intends to extend the foundry 90 by 100 ft.

Standard Crucible Suffers Fire Loss—Just as foundations were being laid for a one-story addition, 45 by 130 ft., the main building of the Standard Crucible Steel Casting Co., Milwaukee, Wis., was destroyed by fire on May 1. Work on the addition will be rushed to provide facilities pending the reconstruction of the original plant.

Fairbanks-Morse Plans Extra Payment—More than 6000 employees of the Eclipse works of Fairbanks-Morse & Co., Beloit, Wis., are expected to share in a bonus system which the company announced it has inaugurated, effective May 1. All employees who remain in continuous service for one year will receive during the intervening period an extra payment of 10 per cent upon earnings, payable quarterly. The bonus will be paid only to those receiving less than \$2,100 annually, not including overtime.

Chevrolet Service Managers Convene—Zone service managers of the Chevrolet Motor Co. held a three-day session at Flint, Mich., recently. More than twenty were present, and there were thirty-six at the dinner given Thursday evening. F. A. Bonham, manager of the parts and service division, presided at the business sessions. M. E. Coyle, comptroller, was present from New York, as was

also J. H. Newmark, manager of the advertising division. Both were speakers at the dinner.

Giant Tire Plant Burns—The Giant Tire & Rubber Co., Findlay, Ohio, plant has been completely destroyed by fire. The loss is estimated at \$140,000.

Findlater Heads Briscoe Sales—James R. Findlater has been elected vice-president and director of sales of the Briscoe Motor Corp., Jackson, Mich. Mr. Findlater formerly was general supervisor of sales.

Distributor for Smith Signal—Weiss & Sinclair, New York, have taken over the entire distribution of the signal made by the Smith Signal Corp., New York, and will give their exclusive time to the promotion and sale of the device. The device is to sell at \$20.

Willard Battery Promotes Gould—D. C. Gould, formerly assistant district manager for the Willard Storage Battery Co. at Chicago, has been appointed district manager with headquarters at Indianapolis, Ind. Mr. Gould succeeds E. B. Reeser, who has been appointed district sales engineer at Indianapolis.

Johnston Establishes New Service—The William R. Johnston Mfg. Co., Chicago, has established a special service for motor car manufacturers on the design and construction of tops. Louis N. Gay, for twelve years head of the Consolidated Auto Top Co., Cleveland, Ohio, is in charge of the service.

Herz & Co. Reorganize—The Pro-Mo-Tor Fabricating Corp. has been organized to push the Herz plug and other specialties made by Herz & Co., New York. The officers are: President, Russel A. Cowles; vice-president and general manager, Gustave L. Herz; treasurer, Edward S. Rothschild; secretary and counsel, Mark Eisner. An advertising and selling campaign will be inaugurated. The plant has been enlarged recently, and new equipment obtained.

Girls Handle Electrics for Agency—The Leach, Brouster & Co., St. Louis, Mo., which handles only electric cars, has replaced the "pony boys" with girls. The girls call for and deliver cars to residences on telephone

calls and care for the interior of the cars. They do not attempt any mechanical work, but several have shown an interest in learning the mechanics. The cleaning of the cars is said to be vastly superior in the hands of the girls.

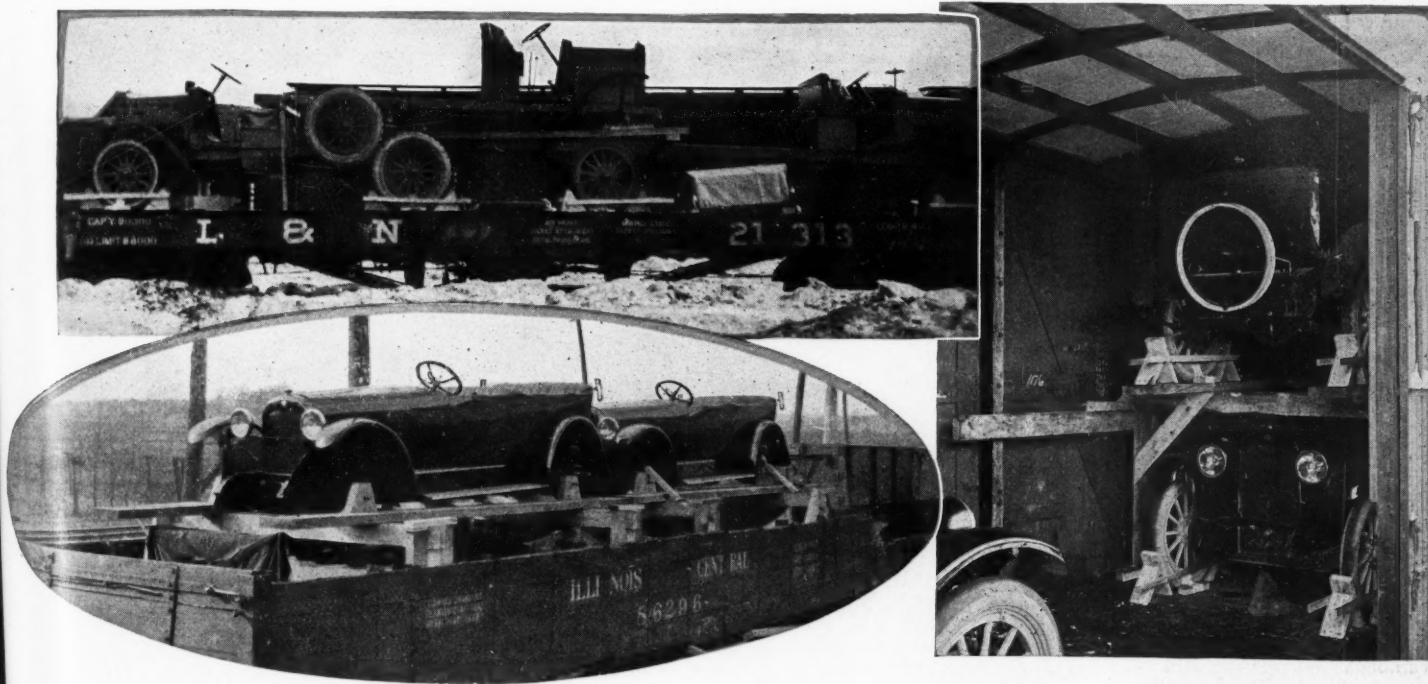
Timken Roller Promotes Lothrop—M. L. Lothrop has been appointed assistant factory manager for the Timken Roller Bearing Co., Canton, Ohio. Mr. Lothrop has been metallurgist and in charge of the steel and tube department for the last seven years.

Maker Moves Materials by Truck—Fuller & Sons Mfg. Co., Kalamazoo, Mich., is operating a 5-ton truck between its plant and its principal sources of material supplies. Several long-distance trips have been made, and the truck has brought through loads of material at practically the same cost as by express in shorter time.

One Meeting Does the Work—During the Liberty Loan campaign the E. A. Laboratories, Inc., Brooklyn, N. Y., had two speakers address their employees. After the meeting 108 of the 110 employees subscribed for \$7,000 worth of bonds. The two other workers already has subscribed through their children from school.

Ajax Subscribes 100 Per Cent—The Ajax Rubber Co., Inc., points with pride to the fact that the Ajax general office in New York, the entire Ajax sales force and all Ajax branches subscribed 100 per cent to the Third Liberty Loan. All but ninety-eight of the more than 2,000 workers subscribed also, and the total Ajax subscriptions were about \$500,000.

Wisconsin Gear Is Building Plant—The Wisconsin Gear & Axle Co., organized recently and now building the first unit of its plant, Milwaukee, Wis., will manufacture automotive gears and axles, specializing in a safety caster front axle for motor vehicles. Production will start about June 15. The first shop is 50 by 120 ft., of brick and steel, located on a 2-acre tract. The officers are: President, Jacob Schamer; vice-president and general manager, C. E. Frederickson; secretary and treasurer, H. G. Bruhuke.



CARS AND TRUCKS IN DECKS TO SAVE SPACE—How the Nash Motors Co., Kenosha, Wis., is decking its cars and trucks to save rolling stock. Four cars are shipped where formerly two were shipped by using the method shown, and three trucks in place of two

From the Four Winds



A CAR SALE A DAY HER AMBITION—One of the representatives of the South Side Buick Sales Co., Chicago, carries a card introducing J. N. Tracy, the ambition of whom it is said is that of selling a car a day. The initials are feminine in gender, for it is Mrs. Janet Newton Tracy who has this ambition. The fact that she piled up a mark of one every other day in less than four months in the business may be taken as indicative of the probable achievement of her ambition at no late date. The reason she seems so cheerful in the photograph perhaps is because she had sold two cars already on that day.

TORONTO Thieves Get 811 Cars—Toronto, Ontario, thieves stole 811 motor cars last year. These motor cars were worth approximately \$405,500. The police and the owners recovered 799 cars and arrested 150 persons. The cars recovered were worth \$399,500.

New Jersey Funds for Roads—In all \$445,000 will be distributed by the New Jersey highway department out of the 1918 motor fees to the twenty-one counties of the state for immediate road improvement needs, and during the year \$1,600,000 will be so allotted. This money will be spent on roads other than those included in this year's plan for improvement under the \$15,000,000 state highway system, which will be paid for by direct taxation.

Motor Cars on 220-Mile Route—The absence of direct rail connection between San Angelo and San Antonio, Tex., has caused the adoption of a regular line of passenger cars between the towns. The distance is 220 miles and the schedule calls for a one-way trip in 13½ hr., a reduction of 7 hr. in the time it now takes to go by rail. The route is via Eden, Barnard, Mason, Fredericksburg, Boerne and Leon Springs. Daily trips will be made each way.

Trucking Service for Kentucky Towns—Improvement of freight facilities between New Albany and Louisville, Ky., by the utilization of motor trucks is planned by the New Albany chamber of commerce. The matter was discussed at a meeting of the board of directors of that body this week and referred to a committee. It is proposed to establish central freight bureaus in New Albany and Louisville so that commercial cars sent from one city to another always may have a load for the return trip. Often two or three days and sometimes ten days

are required to transport a car of freight from one city to another, due to congestion in the railroad yards.

Manitoba Cars Are Doubled—The Province of Manitoba, Canada, up to the present has issued 15,350 car licenses. This is about 100 per cent increase over the number issued at this time last year. It is anticipated that the total issuance this year will be 25,000. In 1917 18,000 licenses were issued.

Ontario Cars 10,000 More—Ontario in the first three months of the year had an increase of 10,000 in the number of car licenses taken out compared with the corresponding period of last year. The total number of licenses for motor cars in the Province of Ontario to March 31 was 48,500. There are 4616 licensed chauffeurs in Ontario and 2000 licenses for motorcycles.

Minneapolis Club Out for 2000—G. Roy Hill has been re-elected secretary of the Automobile Club of Minneapolis. He is also state secretary. Other officers are: President, Earl Partridge; vice presidents, F. S. Gold and L. C. Warner; treasurer, J. H. Prior; assistant secretary, R. H. Jennings; attorney, G. A. Will. At the opening meeting a record gain of fifty in membership was reported for April. The committee will make a total of 2000 members before mid-season.

N. A. D. A. Advocates Anti-Theft Law—The National Automobile Dealers' Association has offered its assistance to the American Society of Secretaries of State in perfecting a proposed law to stop stealing of motor cars. The secretaries' association proposes to introduce a law in every state at the next legislative sessions. The law would make transfer of motor cars exactly like that of land, by recording with the proper authority and identifying the ma-

chine by engine numbers and other marks, all machines not so transferred to be considered stolen property. Machines without engine numbers would have them supplied by the state license bureau and have them cut into the metal.

Heaping Coals of Fire—This early spring when there were many deep mud holes in the roads Connecticut trolley crews tossed out a line and towed the trucks and passenger cars onto the firm road. One week two 5-ton trucks loaded with coal were down deep in the soft sand where the road is being repaired. The foreman of the trolley station at Warehouse Point dispatched a freight car to haul the trucks out. According to the highway officials everyone connected with the trolley company is white to the core.

Third Annual Show at Red Bank, N. J.—The third annual show of the Monmouth County Automobile Dealers' Association was held in the Red Bank, N. J., armory and proved to be the most successful exhibition yet made in that city. More than fifty cars, of thirty makes, were shown, and accessories were exhibited by ten firms. Dancing was a feature every afternoon and evening. Sales were made on the show floor and dealers report that the prospects for sales developments as a result of the show are better this year than ever before.

Wisconsin County Restricts Truck Loads—The Rock County, Wisconsin, board of supervisors has adopted an ordinance providing that no motor-propelled or horse-drawn vehicle shall carry a load in excess of 6000 lb., under penalty of a fine of from \$1 to \$100. So far as horse-drawn vehicles are concerned, the ordinance says the load shall not exceed 1500 lb. per inch width of tire. This is the first time a Wisconsin legislative body has placed such restrictions on motor truck traffic in effect, and it is expected that a hard fight will be undertaken at once for the repeal or modification of the ordinance.

Have Your Tires Half-Soled—A Hartford, Conn., tire agency is doing a snug business this season in stitching two shoes together to form one of heavier dimensions. For the work a special machine is employed much like a shoe-stitching machine. The tire used for the outer cover is stripped of the beads and the remainder stitched, two rows each side to the inner or complete shoe. The tire agency asserts 20,000 miles of wear are to be had. As a rule two tires which have not worn down too much are employed. The tire stitchee has more than he cares to handle, and usually there is a large pile of tires waiting for him.

Would Require Six-Month License—An ordinance pending before the St. Louis board of aldermen would require each person who drives a motor vehicle of any kind to obtain a license from the city each six months. The bill was drawn by the city board of estimate. It requires that each person who shall at any time drive any motor vehicle appear in person and show reason why he or she should be licensed, by explaining familiarity with motor vehicles, traffic rules and establishing sufficient character. A fee of \$1 is required to obtain the license. The bill had advanced to second reading before the various clubs learned of it.